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THE march of progress in the applications of electrical transmission of energy is so rapid that even our inquisitive "go-ahead" Americans can scarcely keep pace with the announcements of great and still greater achievements. It may therefore seem unreasonable to criticise the more sedate and unexcitable Englishmen for not knowing what has been done and what is being done in this new field, where, as we have said, progress is so rapid that it literally "goes like a streak of lightning."

We do not, in fact, complain of this ignorance on the part of foreigners, of facts so new, and of improvements which follow each other in such rapid succession, but it seems strange that a scientist whose name is so well known as that of Professor AYRTON, F. R. S., should, in an address on electric transmission of power before the British Association at a recent meeting, almost wholly ignore the work done in this country. It is true Professor AYRTON says that we have "6000 electric motors, working machinery, while in Great Britain there are hardly 100:"—and admits that the development of electric engineering is far more advanced here than in Europe; still he cites as examples of our practice only a *series* system for propelling trains which was tried in Denver, and has been *abandoned*, and makes the very slightest and incredulous mention of the unqualified success made by the Sprague Company in Richmond, Virginia. No reference, whatever, is made to the longest working circuit in the world, which was successfully put up on the Feather River, California, by these manufacturers, or to the many successful applications which have been made at our mines by the Brush, Sprague, Thomson-Houston, Union Electric Company, and other electric engineering firms, and which have been recorded in the ENGINEERING AND MINING JOURNAL.

CHINESE PROGRESS.

We have received this week an interesting letter from our valued correspondent in China, Prof. JOHN A. CHURCH, which we give on another page. In our issue of September 8th we noted some details of Mr. CHURCH'S work in China, furnished by the most recent consular report from that country, and we are pleased to learn from Professor CHURCH himself that the Chinese authorities are thoroughly in earnest, and anxious to see mining "in foreign fashion" established in the Empire. This is good news, but what is still better is the assurance that he gives us, after his experience of the people he is dealing with, that the 100 miles of standard gauge railroad now nearly completed is but the commencement of a vast system of improvements which will come surely, if slowly, as compared to most other countries. His decided opinion is a full confirmation of the views we expressed in our last issue on this point.

It is true that we cannot compete with Europe in supplying rails, but that is of little consequence, for with her native coal and iron it will not be long before China will make her own rails; but we can supply general machinery, locomotives, cars, and many other things, in which articles we compete with and excel the world. It may be unnecessary, to draw the attention of our manufacturers to the remarks of Mr CHURCH with regard to the importance of establishing a reputation for ability and uprightness in dealings with the Chinese, but this is the key to the situation, and will bear repetition.

BRITISH IRON AND STEEL STATISTICS.

Mr. J. S. JEANS, Secretary of the British Iron Trade Association, publishes the statistics of iron production and consumption for the first half of 1888, which are summarized as follows:

	Gross tons.
The stock of pig-iron at December 31st, 1887, amounted to	2,715,475
The production of pig-iron during the six months to June 30th, 1888, was	3,902,804
	6,618,279
Less stock at June 30th, 1888	2,673,860
Total deliveries of pig-iron for six months to June 30th, 1888	3,944,419
" " " to June 30th, 1887	3,603,223
Increase in deliveries for half-year	341,196
Total consumption of pig-iron in United Kingdom for six months to June 30th, 1888, after deducting exports of pig to foreign countries	3,442,686
Total consumption of pig-iron in United Kingdom for six months to June 30th, 1887, after deducting exports of pig to foreign countries	3,043,925
Increased consumption in United Kingdom for half-year	398,761

This showing is highly satisfactory, and were it not for the enormous stocks on hand, might be expected to lead to a considerably higher range of prices. The stocks will, however, effectually prevent the maintenance of any considerable advance in prices.

BRITISH STEEL STATISTICS FOR 1888 IN TONS OF 2240 LBS.

	First half 1888. Tons.	First half 1887. Tons.
Reduction of Bessemer ingots	1,051,481	915,554
Bessemer rails	487.174	445,785
Bessemer steel other than rails	357,274	.....
Open-hearth steel ingots	616,421	405,390
O. H. plates, bars, blooms, castings and rails	353,718	.....
O. H. furnaces running	223½	.....
O. H. furnaces idle	47½	.....

These figures of steel production show much better than do those of iron production the immense improvement that has come into the British iron trade. The increase in open-hearth steel production is especially noticeable.

HIGHER TEMPERATURE TESTS REQUIRED FOR ILLUMINATING OILS.

In a paper by SPENCER B. NEWBURY and W. P. CUTTER, of Cornell University, published in the *American Chemical Journal*, attention is drawn to the fact that the legal regulations in regard to the flashing point of illuminating oils were mostly framed under different conditions to those now existing. It is pointed out that in the State of New York, for instance, where no oil is allowed to be sold which flashes below 100 degrees F., the legislation was probably based upon the observations of Dr. C. F. CHANDLER, who found that the oil in the lamps generally in use at that time (16 years ago), while burning in rooms at ordinary temperature, rarely reached 100 degrees F., but nevertheless even he recommended the adoption of a legal flashing point not lower than 120 degrees F.

Messrs. NEWBURY and CUTTER rightly remark "there can be no doubt that in using kerosene of ordinary quality in the powerfully heating lamps which are now common, we are dependent for our safety upon the accurate construction of the burners, which render it difficult for the

explosive vapors in the lamp to become ignited. An oil which flashes below 120 degrees Fahrenheit is not safe to use in these lamps, and with oils of ordinary grade the conditions of explosion are constantly present."

One uncomfortable conclusion arrived at by these gentlemen from the tests they have made, is, that "oils which flash at a point considerably above the legal requirement may, under proper circumstances, give violent explosions at their flashing temperature." The expression "proper circumstances" refers to the certain proportion of air mixed with the heated vapor.

Another point brought out is the unreliability of the burning test which determines the temperature at which a sample of oil will burn in an open vessel, as an indication of safety. An oil may show a very high burning test and yet be of low flashing point and therefore unsafe.

Taken altogether, it seems to us that it is time that the legal flashing point should be raised to 120 degrees F., for as it stands at present it is a sham and a danger instead of a protection, and any slight increase in the price of oil considered necessary by the refiners would be more than compensated by the fewer accidents and losses that the safer material would occasion.

COST OF COAL MINING AND COKE MAKING IN THE CONNELLSVILLE DISTRICT, PA.

The Connellsville region of Pennsylvania has long enjoyed the distinction of producing the cheapest and the best coke in this country, and though these claims are strongly contested by some other districts, especially by the Flat Top district of Virginia, they are still accepted in a general sense, and are no doubt well founded. As this coke supplies the larger part of our blast-furnace fuel, and has been selling during the greater part of this year at $1 per ton of 2000 pounds delivered on the cars at the ovens, there is much interest in knowing what the cost of production is in that favored locality. The following itemized statements show what the actual cost has been at several of the large coke-works in the district. We are not at liberty to give the names of the works, but the figures may be relied on as accurately representing the actual cost during a portion of the present year.

The following figures represent the cost at a works where one half only of the ovens were in blast and wages were based on 75 cents per 100 bushels (7600 pounds) for mining.

COST PER TON OF 2000 POUNDS.

	Coal.		Coke.
Mining	$0.204	Coal to ton of coke	$0.682
Hoisting and pumping	0.045	Coal to boilers	0.048
Dumping and check boss	0.020	Drawing	0.185
Hauling	0.031	Leveling	0.013
Trackmen	0.004	Removing ashes	0.009
Trappers	0 006	Cleaning and repair R. R. tracks	0.012
Mine and fire boss	0 034	Shop work	0.005
Shopwork	0.021	Yard Boss and office	0.021
Proportion of office salaries	0.006	Forking	0.010
Surplus and feed	0.072	Loading stock	0 099
		Supplies and feed	0.008
	$0.443		$1.050
Value coal in the ground or royalty	$0.100		0.154
Net cost without interest on investment	$0.543		$1.204

This coke was selling at the time for $1 per ton on the cars.

At another works we have the following figures, the wages being based on 75 cents per 100 bushels (7600 pounds) for room coal and 85 cents for heading coal:

Room and heading coal	$0.2178	Coal to ton of coke	$0.4714
Taking up bottom	0.0007	Charging ovens	0.0221
Hoisting and pumping	0.0250	Leveling	0.0244
Hauling	0.0578	Drawing	0.1749
Props and roads	0.0319	Loading and forking	0.0529
Repairs, etc	0.0064	Repairs and miscellaneous	0.0550
Mine boss	0.0140	Salaries and office exps	0.0448
	$0.3536		$0.8455
Coal in ground or royalty	.1000		0.1540
Total cost	$0.4536		$0.9995

Another works cost sheet gave per ton of 2000 pounds for coal, $0.38.

Coal to ton coke	$0.506
Manufacture	0 420
Cost per ton of coke on cars	0.926
Royalty, say	0.154
Total cost, say, per ton	$1.08

Wages based on 80 cents per 100 bushels.

It must, however, be said that an adjoining colliery was paying on the basis of 67 cents per 100 bushels, with a corresponding difference in cost of coal and coke.

Perhaps the lowest cost of coke production ever reached in the Connellsville district was 75 cents a ton, on the cars, when wages were based on 65 cents per 100 bushels.

There are works which cannot produce coke at the figures given, and yet the market price at which all coke furnaces sold during the greater part of the year was $1 per ton.

There, is, however, a credit to be made to the above figures of cost, namely, the profits from store sales, house rent, etc., and this is in many cases a very important item. We have not the actual returns in the instances cited above, but in some of the large Southern collieries and coke-works from 60 to 70 per cent of the pay-roll is paid through the store in goods, on which the profit averages 10 to 15 per cent, and in exceptional cases more than this, and the house rent gives a return of fully 15 per cent on the investment.

If the labor item of cost amounts to 85 per cent of the average actual cost, which may be assumed at $1.00 per ton (exclusive of value of coal in the ground), then the profits on the store, rents, etc., would at most equal the royalty, so that the Connellsville coke makers when selling coke at $1.00 per ton are practically working for nothing, getting back only their cost of production and a bare royalty on the coal in the ground, and no interest on investment beyond that in houses. At $1.25 a fair profit can be obtained on well managed enterprises.

The correctness of these conclusions is confirmed by the financial results to several of the producers.

We shall be pleased to receive further information on this interesting subject from those who have a better record to show.

We shall follow this by an investigation into the actual cost of making pig-iron in practically the same district.

CLASSICAL EDUCATION.

The last *North American Review* contains a clever article, entitled *Artium Magister*, from the pen of Mr. Clarence King, attacking with much eloquent satire the "classical education" of the present day as administered in American colleges, and at the same time asserting the value and need of the classical spirit and form, which, in Mr. King's opinion, this education utterly fails to impart. In proof of this proposition, he appeals to the fruits of the American college-training as exhibited in our literature, where he finds a noteworthy lack of the classical, and a corresponding prevalence, in our best achievements, of the scientific and realistic.

Mr. King's denunciations of the pedantic and critical methods of instruction in the classics—of the substitution of "grammar" for "art," the suppression of enthusiasm, and the inspiration of aversion rather than sympathy—are more forcible and suggestive than definite. And they would have been better deserved a few years ago than they are today. No little advance has been made in the teaching of the Latin and Greek languages, and the history, literature, philosophy and art to which they give entrance; and much of this gain has been due to the patient workers who have perfected text-books. It is cruel of Mr. King to ridicule such men in the sphere of classical education, while he extols the men who in other spheres have perfected the tools and processes of progress.

There is in Mr. King's piquant pages a faint, suspicious flavor of Japanese preserves—of the modern fashionable craze for "art" without "grammar." We are growing a trifle tired of this, even in fans, curtains and crockery. As a protest against the routine spirit of the age, it was very good and helpful; but when it becomes itself the spirit of the age, it needs to encounter in turn another protest. Mr. King does not seriously propose, of course, that his ideal *Artium Magister* should skip the Latin and Greek grammars, as the Japanese artist skips perspective and anatomy, and spring over the despised heads of lexicographers, grammarians and tutors to the heights of Fusiyama or Parnassus. It is not quite certain what he *does* propose. He differs from the ordinary assailant of classical education in declaring the transcendent preciousness to mankind of the classical influence. It must not be lost; if we understand him, it must continue to be drawn through the channel of the original Greek and Latin literature. But the student should do this without tutors and recitations, and with contempt for grammars and dictionaries. It is a pity to intrude upon the classic calm of this degree; yet boorish ignorance breaks the sublime silence with the question that bothered Dogberry, "How if he will not?" If Mr. King knows a better way, he should join the despised company of Andrewses and Stoddards and make it known in a text-book.

There is nothing finer in his essay than the way he goes for Alexandria—"poor Alexandria!" From Ptolemy Soter down, nothing but "gaping centuries," and Theocritus and grammar! We feel moved to say a word out of sheer pity for Alexandria. May it not be that Mr. King does not know what was in the great library used as fuel for the baths by a certain notable despiser of grammar? May it not be that he has overlooked some things that were saved from destruction—for instance, the "Wisdom of Solomon," sublimest of non-canonical books, lighting with the divine fire of Hebrew faith the lofty summit of Platonic speculation? May it not be that he has failed to catch the meaning of even the theological and critical schools of Alexandria? We cannot undertake to discuss such questions here; but we can assure Mr. King that the bombardment of Alexandria is not in literature and philosophy, as in modern warfare, altogether a one-sided affair. Even in the military case, the attacking party was greatly embarrassed by the smoke of its own big guns, and the practice was not remarkably good.

Perhaps we could better appreciate what it is that Mr. King desires if he had been more explicit in indicating the kind of books that ought

to be written, to illustrate in this age the effects of classic influence, or, back of that, if he had pointed out in what works of classic literature he finds that influence. How many of them are there? Did their age produce them? If so, why were there not more of them? If not, why should this age produce their equals? What has been the test of their greatness? Their survival after so many centuries? Then the same test will have to be applied to their successors, and Mr. KING must wait.

We are, like him, believers in classical education, but not for the same reason. Like him we deplore the imperfections of its present methods, but not to the same extent; for we think they are constantly improving. We are not specially stirred by his sarcasms about the wasted devotion of ten years to this or any other branch of study; for we do not believe that there ever was such a waste of time. In our opinion, the average student of to-day wastes in the reading of newspapers and novels (we mean only that part of his newspaper and novel-reading which is purely trivial, unnecessary and distracting, without being instructive or inspiring), as much time as would enable him to read in the original all the decent Greek and Latin classics; and we do not believe that the time actually given to these studies is to be measured by the number of years through which it is distributed.

On the other hand, we expect from a classical education no crop of high-toned artists, but a prepared soil, in which artists as well as other people can grow with greater symmetry and fruitfulness.

One great argument for the teaching of Greek and Latin in colleges is, to our mind, undoubtedly growing weaker, as the modern world severs itself from the ancient, and preserves in new forms what has proved best in the old. It is no longer so important as it was, that a man should command these languages as a medium of sympathy with the cultivated public, and hence of influence over them. Latin and Greek quotations do not sprinkle our speeches and essays as they once did. Even Mr. KING'S, gracefully dropped here and there, to show us that he could do more, an' he would, somehow do not add to the force of his thought. In a word, there is less need, now-a-days, to learn Latin and Greek "in order to be able to quote, you know." Yet even this use does not, and will not, wholly die out—only quotations will go deeper; and instead of the display of words, we shall have the appeal to great thoughts and movements of man.

In this sphere—the study of the real life of the elder world, in all its departments—our generation is far more fruitfully busy than that of the Renaissance. Of course it can be thoroughly explored by specialists only, and it is not necessary or possible to make our college students all specialists. The question remains, therefore, whether the discipline and the uses to be gained from Greek and Latin are important enough to justify their retention. This is too large a subject to be entered upon at this time. We can only say, with regard to it, that either these languages, or some substitute, must supply the needed element; that modern languages are not a sufficient substitute; and that physical science is not a substitute at all.

It must be remembered that the "classical" course consisted of classics and mathematics. Mere drudges and mere smatterers evidently could not show its normal fruit. Mr. KING'S charge, that it tended and still tends to produce chiefly drudges and smatterers, has truth in it, though not much novelty. But is any other course of education free from the same charge?

During the last generation, the claims of science have been recognized to a place in university curricula. A little geology, a little chemistry, a little physics, have been added to general courses, and special schools in abundance have been equipped to teach both science and its applications. Shall we judge *this* system by its fruits? There is a noteworthy lack in its graduates of two things, the art of thinking and the art of expression. Observers and experimenters abound, who cannot state precisely and clearly, and in logical order, what they have observed, or reason upon it with consistency and force. Good mathematicians are remarkably rare, though the number of young men who apply the method of least squares to cases in which it has no value is perhaps on the increase. Drudges and smatterers are as common as ever, but they write worse English than ever. Statesmen do not seem to be bred by the new system. Its contempt for the past seems to have made plagiarism unconscious and credulity hungry and ignorance audacious—that is all.

But we are not pessimists, as we fear Mr. KING is. We have great hope in the more thorough teaching of what we would class as "grammar," in every department. It will not stifle "art," any more than the earth stifles the seed. But the art that grows from it will be something more than an air-plant.

We may be permitted to observe respectfully, in conclusion, that the "Venus of Milo" is declared by the best judges not to be a Venus (which spoils a lovely outburst of classic fervor for Mr. KING); that the East River bridge is not a Bessemer web (which spoils another); and that the word "exegesists" is an abominable monster of Philistinism, suggesting the need of more, not less, downright disagreeable study of grammars and rules, as an element of "culture." *

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Mineral Railroad Development Near Bristol, Tenn.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In my correspondence published in the JOURNAL last week under the title "Mineral Railroad Development near Bristol, Tenn." the printer makes me quote Professor John R. Proctor's professional report as follows:

"The 'red fossil' or Clinton iron ore is a reliable, stratified ore, and three beds are known to be present, one ranging from 30 feet to 65 *feet* thick of excellent soft ore, averaging, from a large number of analyses, from 45 per cent to 54 per cent of metallic iron; another ranging from 18 feet to 24 *feet* thick.

The term *inches* should, of course, have been used instead of feet.

BRISTOL, Tenn., Oct. 8, 1888. D.

The New Michigan Gold Finds.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I desire to make a correction relative to the dispute over the title to land now operated by the Michigan Gold Company at Ishpeming. I find that Mr. I. C. Foley, who had the original option for lease, has not yet appeared in court, and that the case decided in favor of the Michigan Gold Company was against Grummett instead of Foley. Mr. White, who is defending that company's title, had an option upon the land prior to that of Grummett's from Gingrass, claimed it had never been forfeited, and ousted Grummett, who was at work on the ground.

My first informant was a man whom I believed had closely followed the history of the case, and I made notes from his dictation so as to be sure to avoid any error. However, it is believed that the foregoing outline is correct. RICHARD A. PARKER,

MARQUETTE, Mich., Oct. 2, 1888.

Engineering Progress in China.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Matters are moving on here and about as fast as the difficulties connected with distance from market and a working force of undrilled men will permit. The Chinese are showing great persistence in pushing their mining operations, and are evidently very anxious to see mining "in the foreign way" established in the Empire.

I see the JOURNAL is so kind as to elect me to the management of all the "foreign worked" mines in China except one. The position would be honorable, but distances on the cart roads are too great to admit of such supervision.

The Ping Chuan copper mines, distant a day and a half from here, are under the efficient management of Mr. Ellis Clark, of Philadelphia, and the Ping Tu gold mines, nearly a thousand miles from here, are in charge of Mr. H. M. Ellsworth, of San Francisco.

The existence of gold on the Siberian border has been known for a long time and the mines worked to some extent by squatters. Just now the energy of one of the leading officials stationed in the Amoor region is bringing the subject of working the mines for the government into prominence, but it is a question still whether the great distance and inhospitable climate will not frustrate his efforts.

Distance throws great difficulties in the way of all but iron and coal mining. The province of Yunnan appears to be a veritable center of rich deposits of copper, while gold and lead are known to be among its other resources. But it is in the southwest corner of the empire, and there cannot be great hope of utilizing its deposits fully until means of transportation are improved.

This year will see the completion of about a hundred miles of standard gauge railroad in the Empire, and there is little doubt that this line will eventually extend into a great system of iron roads. Fortunately, it is in the hands of most competent men, both native and foreign. Tong King Sing, the Chinese director, is well-known as one of the most advanced of Chinamen, who has been connected already with successful transportation projects in China. Mr. C. W. Kinder, the engineer-in-chief, is an Englishman whose services have won the confidence of the highest officials in the Empire. None but those who have experience of the Chinese can appreciate how important this reputation for ability, mingled with uprightness is. The Chinese have all the money needed and the disposition to use it, but they lack confidence in themselves, in foreigners and in the outcome of industrial works in their country. It is rather the fashion to be carried away by the unbounded possibilities of commerce with, or construction for, three hundred million people, but the truth is, progress in China, in the "foreign" sense of progress, will be slow. Mr. Kinder's hundred miles of railway is more promising than all the schemes of syndicates that have been proposed, and they are not few.

KU SHAN ZU, Mongolia, Aug. 2, 1888. JOHN A. CHURCH.

Electric Omnibus.—There is running in the streets of London in the early hours—from three to five A. M. nearly every day of the week—an electric omnibus, for the purpose of testing the practicability of this invention in the city streets. The route has been by Hyde Park, Oxford street, Holborn, Fetter Lane, Strand, to the Hotel Metropole.

Meteorite in Brazil.—The Bendego meteorite is now in the national museum of Rio de Janeiro. The transportation over 70 miles of mountainous country to the nearest railroad station was directed by Chevalier Jose Carlos de Carvalho, in the name of the Sociedade de Geographia de Rio de Janeiro, the necessary funds, amounting to about £2000, being generously furnished by Baron Guahy. The weight, verified on the scales of the Bahia Railroad, is 5361 kilogs. The comparative thickness of the crust of oxide formed since the first attempt to remove it in 1785, and that found in the original resting place, afford a basis for a rough guess at its age, which may safely be put down as over six centuries.

THE MINERAL RESOURCES OF COLOMBIA.

An addition has recently been made to the rather scanty literature concerning this region by M. de Bruycker, civil and mining engineers formerly manager of the Garcia Riviera Institute, Santander, Spain. As this gentleman's paper is an interesting one, and apparently written without exaggeration, and the country in question has been attracting considerable attention from our capitalists and mining experts, we shall make a few extracts from it. In referring generally to the country, M. de Bruycker writes that it contains more gold and silver bearing zones than any other, and is one in which iron and copper, lead, zinc, antimony, arsenic, and cinnabar are to be found among the metals, while salt beds abound, and sulphur, kaolin, and fire clay are to be found. With reference to the different districts, he says that Cundinamarca and Boyacá are comparatively poor in gold and silver bearing lands, and for this reason he only alludes to the Ariari and Guaguaqui gold beds, to the silver bearing copper lodes of Tosca, to the gold veins of Villa de Leiva and Loatá, and to the gold washings in the beds of the Guateque and Cocuy. In the eastern ridge of the Cordillera, which separates Pamplona from Bucaramanga, and covering a space of over fifty kilometers, the primitive formations are interspersed by gold and silver bearing ledges. Under the Spanish rule these reefs were worked. The wealth obtained from them is a matter of history, while a visit to-day to those localities affords proof of the vast amount of labor which was expended to cut the tunnels into the mountains which can yet be seen, and some of which extend from 50 to 500 meters in length. These main tunnels, opened in former days, measure about ten kilometers—and when one remembers that the rock cut through is granite, that the means of working were of a most primitive nature, it becomes evident that only rich returns would repay the labor required to overcome such obstacles.

At Baya and Vetas thin quartz lodes are found. Here it will be noticed that the richest leads are situated either horizontally or perpendicularly—a fact with which the old miners were well acquainted, as is proved by the manner in which they followed the lodes. These Baya and Vetas mines, or "Pamplona mines," were abandoned after the declaration of independence, and, although we know from periodical inspection that they contain great wealth, they are not worked any more than are the numerous reefs which are everywhere observable, and which have never yet been touched by the miner's pick. In this region there is the old Santa Catalina mine, which was worked by an English company up to 1850, and abandoned as unprofitable, simply because the process of amalgamation was defective, and not from the absence of good metal. The company had also at that time to contend against the decree which was then issued prohibiting the exportation of the precious metals. At no great distance from Baya and Vetas rich gold washings have been formed by volcanic action and the wear and tear of ages, and climatic influences on the sides of the mountains. Here the gold is found in a detritus composed of quartz, gneiss, mica and iron; and from the beds of the Ematá and Giron, which wash through this formation, gold has been found for centuries.

In the Bucaramanga gold washings, the precious metal is found principally in scale, and seldom as dust or nuggets, and it is owing to miners not having noted this fact that they have lost, through defective apparatus, the gold which otherwise would have well repaid them for their labors. The gold washing machinery of to-day would save every grain which was then lost. Its quality is the best known, showing only ·02 of silver to 0·98 pure gold.

Goajira and Rio Hacha alluvial deposits are alluded to, as also the Tiqui quartz reefs, and the Porcé Sinú, San Jorge and Uré sands, and the reason of the failure of the Sinú Company is clearly explained by the fact that the apparatus was inappropriate for working the class of gold which is found there.

In Antioquia the Porcé and Neclin rivers may be pointed out as rich in gold for a distance extending over some 23 leagues in length by 15 in breadth—and here a square meter of earth has produced one pound in weight of gold, whilst at Dos Bocas, on one occasion, one pound in weight of gold was obtained from only fifteen of sand.

ELECTRICITY AS APPLIED TO MINING.

Under the above heading a paper was read at the recent meeting of the British Association at Bath, England, by Mr. Frank Brain, which we condense from our contemporary *Industries*, as showing what progress has been made abroad in this direction.

The recommendations of the Mines Commission and the passing of the more stringent Coal Mines Act of 1887 have both stimulated mine managers to inquire into and recognize the advantages of electricity for blasting and lighting. By means of a small hand magneto battery and electric fuses all the shot firing in most of the fiery collieries is now done, the explosive used being one of the many lately introduced, which, fired by a electric detonator, give off no flame. Dynamo machines at many pits are used for lighting the surface and main roadways of the colliery, and this current has also been used for the purpose of shot firing, notably at Ynyshir Colliery, Rhondda Valley, South Wales. All the shots are fired in this way simultaneously with every man out of the pit, thus putting loss of life beyond possibility. The adoption of the electric lamp in place of the well-known ordinary safety-lamp is now very strongly advocated. There are several in the field, notably the Swan and Pitkin, using secondary batteries, and the Schanschieff, using a primary battery. The South Wales Institute of Engineers, who, with other kindred societies, have lately had these and other electric lamps before them, have referred the matter to a special committee to inquire into and report upon. Several colliery engineers in South Wales are practically testing them—one, Mr. G. W. Wilkinson, of Risca, having several hundreds in daily use. So satisfied is he with their results that an order has been given for a still further number. The applications of electricity to transmission of power are confined in Great Britain to three collieries only, viz.: Trafalgar Colliery, Forest of Dean; St. John's Colliery, Normanton; and Allerton Main Colliery, near Leeds. At Trafalgar, what was a very small pumping plant, started in December, 1882, developed by May, 1887, into three sets of plants, doing the underground pumping of the colliery, and that at a saving of some £500 per annum. At St. John's, a 6 horse-power set of pumping plant did such excellent work that a 33 horse-power set was put down in March last in another part of the colliery, and has since been in continuous work. These extensions speak for themselves. In each case the power is conveyed by cables from the dynamo at the surface to the pumps placed at a considerable distance underground. At Allerton Main, very small quantities of water are being dealt with at inaccessible points. The power is supplied to the motors from secondary batteries charged at the surface, and conveyed to the required points in the colliery tubs or carts. A coal cutter is also being driven by the same method. On the Continent, underground haulage at Zankerode Colliery has been successfully and economically working since 1882, and also at Hohenzollern Colliery since 1884, the cost in each case being much less than by horses. A gold mine in New Zealand has recently been made valuable by transmitting the power from a waterfall two miles away. The conductors, supported on poles are carried direct over the mountains, 2000 feet in elevation, intervening between the fall and the mine.

Mr. Nicholas Watts gave the following particulars with regard to miners' electric safety-lamps:

After referring briefly to the but partial success attained in modifying miners' oil lamps to adapt the same to the currents now obtaining in collieries, and noticing the apparent suitability of the incandescent lamp as a substitute, the author describes the following miners' portable electric safety-lamps.

The Swan Lamp.—Secondary battery. Four cells grouped together in a block of gutta-percha which is enclosed in a wooden case. The elements are lead oxide and lead. Luminosity, 1 to 1⅓ candle for ten hours' duration; weight, 7 pounds; price, 27s.; cost of maintenance, 3½d. per week. In extensive use in South Wales.

The Schanschieff Lamp.—Single liquid primary battery. Four zinco-carbon cells, the carbon non-porous. The peculiar novelty is the nature of the exciting liquid, which is a solution of the basic sulphate of mercury, about 36 per cent of the salt being held in solution. The solution is sold at 4s. per gallon, of which 3s. 7d. is allowed for the same quantity of the spent liquid with its solid residue and free mercury precipitated by the cells. Luminosity (with reflector), two to three candles for nine hours' duration; weight, about five pounds; price, 30s.; cost of maintenance, 3¾d. per week. Tested at Cannock Chase, Mardy, Merthyr and elsewhere.

The Pitkin Lamp.—Secondary battery. Four cells. Luminosity (with reflector), 4 to 5 candles for ten hours' duration. The lamp is fitted with a switch and resistance to regulate the expenditure of the e. m. f., which, if allowed to act without check, would, when the battery was started, destroy the filament. Weight, 8 lbs.; price £2 2s. Used at Llwynypia, Ocean Colliery, Treviky, and elsewhere.

The Walker Lamp.—Primary battery. Three carbon-zinc cells in a strong brass cylinder attached to an outer case of brass or copper. The exciting liquid is a mixture of bichromate of potash, nitric acid, and sulphuric acid. Luminosity (with a reflector) sufficient to enable newspaper print to be read at a distance of 12 feet, for ten hours' duration. Weight, 7 lbs.; price, by the gross, 32s.; cost of maintenance, 1d. per day.

The Portable Electric Syndicate's Lamp.—Secondary battery. Luminosity (without reflector), 1¼ candle for ten hours' duration; weight, 4¼ pounds; price, one guinea. The lamp is fitted with an automatic arrangement in connection with the incandescent lamp, whereby if an outer casing of toughened glass be broken the current is cut off to prevent explosion of fire-damp.

The Vaughton Lamp.—Secondary battery. The electrodes are wedged tightly in the cell, rendering the battery so compact that it may be subjected without injury to much rough usage. The lamp weighs 5 pounds. It takes six hours to charge. The working cost is estimated at 1d. per day. The electrolyte used is sulphuric acid diluted with eight times its volume of water, and is renewed twice a week. One shilling's worth of acid suffices for one hundred lamps for one week. The price is from 25s. to 27s. 6d.

QUICKSILVER MINE AND WORKS AT ZAITSHEFF, RUSSIA.

By A. Auerbach.

This mine in the Bakmout district of the Government of Ekaterinoslav was first opened in 1879, but owing to want of capital was soon abandoned. The present company commenced preparatory working, deepening the existing shaft in 1885, and in 1886 built the metallurgical works, where the first ore was reduced in December, 1886. At the present time over 1000 men are employed in the mines and works.

Although the first and only known quicksilver mine in Russia, yet in driving levels many ancient workings were discovered of which there is no historical record. The lode has a general bearing from W. to E., and occurs in the following stratification: 1. A compact and hard gray sandstone, with crevices containing cinnabar; 2. A less compact gray sandstone, full of crevices, and permeated with cinnabar, which forms the lode proper; 3. A compact dark gray slate, forming the hanging-wall of the lode; 4. A rather soft, finely lamellar yellow sandstone. All these strata belong to the carboniferous formation, but the formation and deposition of the cinnabar belong to a later period. There will be five shafts in all. Pending the putting up of a winding engine at the main shaft, the haulage is done by horses. The main shaft is 140 feet deep, and 7 by 15 feet in three compartments. This shaft will afterwards be deepened to 560 feet, and levels will be driven every 70 feet. The existing level is at a depth of 140 feet, and is 179 feet long.

The ore is sorted into four qualities, which make up 84 per cent of the crude ore, namely:

No. 1 about 2 per cent, containing 4·85 per cent mercury.
No. 2 about 10 per cent, containing 2·20 per cent mercury.
No. 3 about 18 per cent, containing 1·33 per cent mercury.
No. 4 about 70 per cent, containing 0·65 per cent mercury.

Thus the mean percentage of mercury in the ore is about 1 per cent No. 4 ore is reduced in a cupola furnace with coke, and the others i

reverberatory furnaces. There are two cupola furnaces, one of a new form, after the design of Mr. Chermaks, of Austria, being a combined reverberatory and cupola furnace, capable of reducing 36 tons of ore a day. A second furnace of this kind is in course of construction, and when finished the total amount of ore reduced per day will be about 160 tons. All the furnaces are furnished with feeding arrangements hermetically closed.

From the furnaces the mercury vapor, sulphuric acid, and products of combustion are led by cast-iron pipes to condensers, also of Chermak's system; they consist of several rows of vertical cast-iron tubes, cooled by a continuous flow of water. The quicksilver, etc., trickles down the pipes into receivers full of water. Gases enter the condenser at a temperature of 450 degrees C., and are cooled down to 35 degrees. Those from the reverberatory furnaces enter at about 500 degrees C., and are cooled to 70 degrees. From the condensers the gases pass into a stone chamber, from which they go by a main flue to the stack-chimney Only a part of the quicksilver settles in the receivers as a metallic mass; the remainder is in intimate mixture with the tarry products of combustion, from which it is separated by repeated washings with caustic lime. About 60 per cent is thus collected, 40 per cent only settling in a metallic mass. The condensers are cleaned out once a week, and the stone chamber and flues once or twice a year.

The cost of opening out the mine, building of works and mens' lodgings, amounted to about $140,000. In 1887, 12,295 tons of ore were raised at a cost of 93 cents a ton. The dressing of the ore cost $1.54 per ton. The amount of quicksilver reduced was 143,154 pounds. The cost of reduction in a cupola furnace is 44 cents per pound, and in a reverberatory furnace $1.18 per pound. Thirty-three per cent of the quicksilver in the ore is lost.

MINING IN SOFT ORE BODIES AT LOW MOOR, VIRGINIA.*

By W. S. Hungerford.

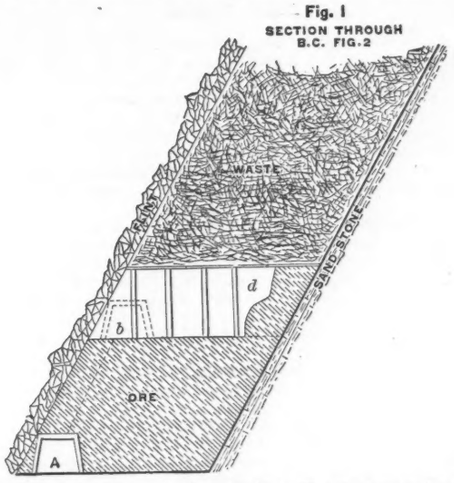
As several papers on the subject of mining in soft ore-bodies have recently appeared in the *Transactions* and in the ENGINEERING AND MINING JOURNAL, the following brief account of the method introduced by the writer at Low Moor, Va., may be of interest. It is in some respects similar to the system at Longdale, Va., referred to in Mr. Rothwell's paper, though differing in many of its details. That system has been employed by the Longdale Iron Company for many years, and to that company the writer is indebted for many valuable suggestions. The method here described will also be recognized as embodying the same general principles as that described by Mr. Goudie in the ENGINEERING AND MINING JOURNAL and the one proposed in Mr. Rothwell's paper above mentioned. It is not claimed that the system here described contains any improvements over those above referred to; and it is given only as showing actual experience with this method of mining.

The ore-bodies at Low Moor lie in a vein which, for the purposes of this description, is supposed to have a dip of 60 degrees and a thickness of 30 feet. These are in fact somewhere near its average conditions, though much irregularity exists, the dip in different portions of the mines varying from vertical to nearly horizontal, and the thickness from 10 to 40 and even 60 feet. The ore is generally soft, and all drifts require close timbering. If several drifts near each other, either one above the other or on the same level, are left standing long, the ore will "creep," throwing timbers out of line and even heaving the bottom badly. In the portion of the vein here described the hanging-wall is a band of broken flint and clay, and the foot-wall is sand-rock, with or without loose sand. The vein here is really inverted, the sand-rock being usually the the hanging-wall of veins of this region.

Main levels (*A*, Figs. 1 and 2) are driven in the vein along its strike, 60 to 80 feet apart vertically, starting from the surface on the side of the hill or from a hoisting-shaft in the valley.

They are usually on the flint wall (see Fig. 1), whether it be the foot or the hanging, because the flint is a better guide in following the vein. These levels are driven along the vein to such a distance from the hoisting-shaft, as may be required to reach all the ore which it is intended to raise through that shaft, in some instances over half a mile. Hoisting-shafts might have been sunk at more frequent intervals, but the mountainous character of the country and the difficulty of surface transportation seemed to determine their location. While the main levels are being driven the pillar between two levels is usually left untouched, except by up-raises connecting the two levels every 400 to 600 feet for the purpose of ventilation. When the levels are completed, the portions of two levels farthest from the hoisting-shafts are connected with up-raises (*a*,*a*, Fig. 2), 60 to 75 feet apart, two or three up-raises are joined by air-drifts (*b*, *b*, Figs.

Fig. 1



1 and 2) and the ground is ready for stoping. The timber in the air-drifts is recovered in stoping. The stopes are 12 to 15 feet high, each pillar between two main levels making 4 to 6 stopes. As soon as a stope is worked out for 40 to 60 feet along the vein a floor is laid, consisting of sills covered with refuse timber or slabs, and the props are shot down. The waste material from above packs solidly upon this floor, and in a short time the next lower stope can be worked, using the floor previously laid as a roof to hold the waste material from the ore. A stope 40 to 60 feet long, measured along the vein, is begun in the drifts *b b* by first mining the ore above the drift-timbers till the floor of the next stope above is reached and setting props. The face of the ore for the length of the stope is then mined back to the opposite wall, as shown at *d*, Fig. 1. The ore is dumped into the chutes *a a a*, and drawn from them into cars on the main levels *A*, and hauled by mules to the surface or to the hoisting shaft.

Fig. 2

Scale 30 ft. = 1 inch.

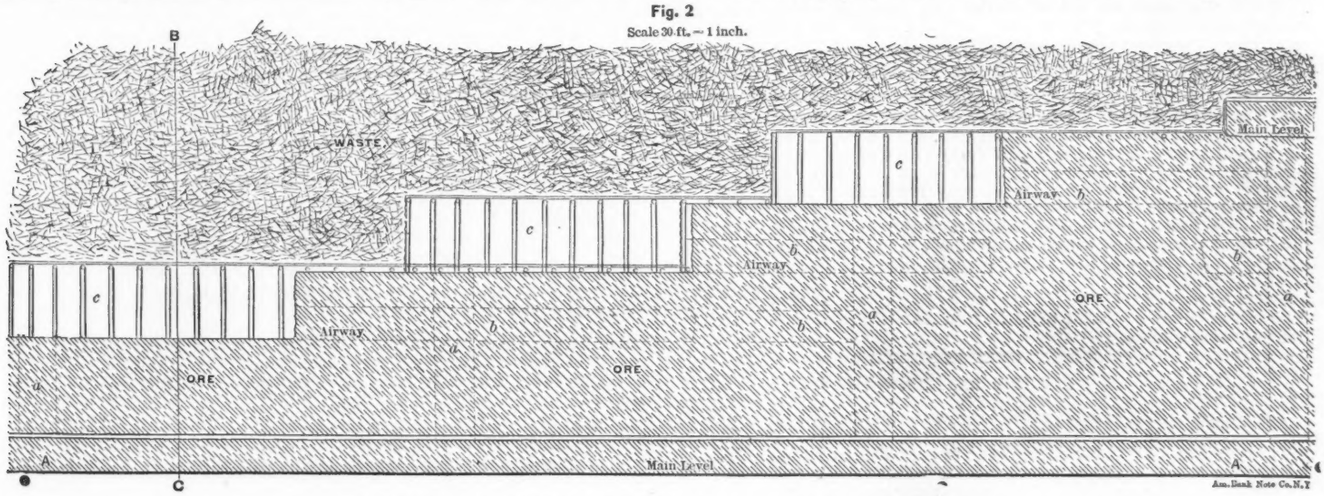


Fig. 2 represents a vertical projection along the strike of the vein, showing three stopes. The middle one is completed and the floor is laid ready for shooting down the timbers.

Fig. 1 represents a section on line *B C* of Fig. 1.

When the vein is 12 feet or less in thickness, so that a single prop will reach from wall to wall, the method is somewhat modified. A stope-drift is driven a short distance above the main level, parallel with it, and connected with it by chutes at intervals of about 50 feet. The ore is then stoped from this drift to the next upper main level, props being placed from wall to wall. These props are eventually shot down, and the waste material is caught by a horizontal floor which will serve as a roof for the next lower stope, as before. In this way the timber for a number of floors is saved, but the modification is only of advantage where the vein is narrow enough to permit a single prop to reach from wall to wall, and where, moreover, the hanging-wall is fairly good.

In this way all the ore is mined; no filling is required and the work is comparatively safe.

During the past four years, with an average of about 200 men employed, there have been but two fatal accidents. In one of these cases a boy fell down a shaft; in the other a man was crushed by a fall of ore. But this happened before the present system was adopted.

The country-rock is soft, and readily fills in the cavities formed. It breaks to the surface, which, in places, is 500 feet above the work. The surface damage is here no consideration, nor does the surface water give

* A paper read before the American Institute of Mining Engineers May, 1888.

much trouble, though in some instances arrangements must be made to conduct it around the surface breaks.

This method has been in use at Low Moor for about three years. The annual production has been about 50,000 tons of clean ore; or, allowing for loss in washing, more than double that amount of material, all of it from underground mining.

AMBER MINING.

The only place in which amber has been found in paying quantities, says R. Kaldenberg in the *Swiss Cross*, is in the Baltic Sea, and the vein extends from western Russia to Denmark, Norway and Sweden. In former years the production of amber depended principally upon the storms occurring in the winter time, for when the sea was convulsed the amber lying on the bottom was thrown upon the shore; but human enterprise stimulated by the demand for the article has changed all this, and for the last twenty-five years various engineering appliances have been used for getting out the amber in the quickest and cheapest way.

The most profitable strata have been found in the Courischer Haaf, which is located in the vicinity of Memel, and there are twenty large dredging boats constantly at work day and night for eight months in the year. There are large strings of iron pails that are constantly dragging along the bottom of the sea and bringing up the sand and what amber there may be in it. This is emptied on the deck of the ship and there it is washed, and the amber picked out from among the sand and stone.

The little village where this industry is carried on is called Schwartzort. It is situated on a narrow strip of land that extends about ten miles beyond the mainland, and is perhaps a mile wide at its widest part. At one time this strip of land was covered with a forest, but the wood was sold off by a Prussian king in the beginning of this century to the Russians. The land has become barren since stripped of its sheltering forest, and now it is nothing but a sandy waste; and, were it not for the amber industry, this beautiful peninsula would be desolate. About ninety miles further west is another little village, called Palmnicken, and here the amber is obtained in an entirely different manner. The most approved diving apparatus is used, and the divers go out in row-boats, each of which is fitted with an air pump. They go down into the sea, where some of them remain as long as four or five hours. Each diver has a little bag around his neck, and a peculiar hook, with which he pulls up sand, and every piece of amber that he finds is thrown into his bag. An encouragement to the diver is that if he finds a piece of amber he is entitled to a prize of ten, twenty-five or fifty cents, according to the size.

While the divers are below in the sea, engaged in hunting for the amber, the miners are just as busy on land, for it seems that the same stratum of the green sand runs, perhaps for thirty miles or more, into the land. The opening of the mine is perhaps a thousand feet from the shore, and it is necessary to go down about one hundred and fifty feet, which is some thirty or forty feet below the level of the sea. To keep the mine as dry as possible, there are several pumps working day and night; and to prevent the earth from falling in, the passages are propped up by logs of wood. There are about forty miles of passageway in these mines, and there are about seven hundred men employed for the various departments. As soon as a passageway is opened, a track is laid, and on this track there runs a little truck, which holds perhaps half a ton of sand. The miners simply cut out the sand and fill the truck. It is then brought to the surface, where the whole contents is thrown into a long trough filled with rushing water, which separates the sand from the amber, which is caught by nets of various sizes. The amber is then cleaned by machinery, and assorted according to its quality and purity. The writer believes himself to be the first American who ever went down into the amber mine.

ELECTRIC HEATING.

The transmutation of energy into heat with reference to the possibility and practicability of roasting ores by the aid of electricity is a subject that we are often applied to for information upon. There are many instances in mining where there is a considerable water power going to waste which, if it could be utilized to generate sufficient heat by means of a dynamo, would be the saving of a large expenditure in fuel. This problem has not yet been solved, but we are glad to note the first step in this direction, viz., a serious, and we believe practical, proposal to utilize electricity for heating, in a communication by Mr. James Asher to the *Electrical World*, which is so interesting that we repeat it here:

Little has yet been done in heating by electricity. The common belief is that it would be too costly. We can get 60 per cent of the total energy as useful heat from a furnace and but 10 per cent from an electric current derived from a dynamo run by steam. Stoves do most of the heating in towns and they give but one fourth of the total energy in useful heat. Three fourths of the heat passes up the chimney. Air rushes through crevices of doors and windows in draughts which are injurious to health.

Suppose the case of a house heated by electricity in a town. Let the current come from the central station and heat coils of flat iron wire. These coils may each cost less than a dollar, and they may be in any part of the house. For cooking and baking the coils may be placed just under or around the vessel holding the article cooked. Less heat than usual would be required, for no soot would be on the bottom of the containing vessel. The fire risk would be much less than at present, as the wire never need be hot enough to cause fires. The heat supply can be turned on or off instantly; thus there will be no loss of fuel when the need of heat has ceased. This applies with great force to summer use.

In heating, cooking or baking, the temperature can be easily kept uniform. Without rising in the morning, the touch of a button at the bedside will turn heat on several coils in different parts of the house. The nuisance of kindling, smoke, ashes and soot, will be abolished, and no stove pipes and chimneys will be needed.

I have said that we may get 10 per cent of the heat energy expended at the central station, and that in using a stove we may get 25 per cent. When we count the cost of stove pipe, chimneys, scuttles, shovels, ash-sifters, kindling, trouble and great fire risk, I believe electricity will be found the cheaper.

When the dynamo at the central station can be driven by water great economy may be obtained. Water power can be supplied ten hours a day at $20 and steam at $50 to the annual horse-power. In this case steam costs two and a half times as much as water. From my previous statements it will be seen that electric heating would cost two and a half times as much as heating by stoves, and in using water power to generate electricity the heat will cost the same as when produced in stoves, even neglecting the cost of stove pipes, chimneys, etc.

Platinum wire has been used for electric heating, but surely the fact that iron is as good must have been ignored. The conductivity of soft iron is nearly as low as that of soft platinum. The ratio of the temperature of melting ice is as 20·73 to 18 03, and the cost nearly as 1 to 5000. I propose to use flat wire, for better results will be had when the heating surface is large. The coils may be suspended from the ceiling.

THE LOSSES IN ROASTING GOLD ORES AND THE VOLATILITY OF GOLD

By Professor Samuel B. Cristy, University of California.

(*Concluded from page* 284.)

It is evident that the conditions for volatilizing the gold are less favorable in the Miller process than in the experiments that I conducted. For, in the first place, the presence of the silver and the base metals must act to protect the gold as long as they are present, for the affinity of chlorine for these metals is greater than that for gold. Moreover, the gold produced by this process is never absolutely fine. Percy states that the refined gold averaged 993·5 fine, the remaining 6·5 thousandths being silver. It would be interesting to know what the effect of pushing the refining to absolute fineness would have on the gold loss. An appreciable loss would then probably show itself. Next, the surface of the gold exposed in the Miller process is incomparably less in proportion to the mass treated than in my experiments. For in a crucible holding 600 to 700 ozs. (19,000 to 22.000 grammes) of gold the chlorine can only come in contact with the gold by bubbling through it, and it does this only after the base metals and the silver have been removed.

In order, however, to make a more definite comparison, let us see what the loss would be if it were possible to maintain a weight of 20,000 grammes of fine gold in the form of a sphere in a molten state in an atmosphere of chlorine, so that the conditions would be similar to those of my experiments. Now the gold sphere of 20,000 grammes would have a surface 736 8 times as great as 1 gramme sphere, or that of a button of 1 gramme of similar shape. The average of all my experiments above a melting heat, except the last (which was at nearly a white heat), gives for a button of 1 gramme a loss of 3 per cent, or 0·03 grammes in half an hour; hence the evaporation from a button of 20,000 grammes would be 736·8 times as great, or 22 grammes, and as the Miller process lasts about an hour and a half, with gold containing 10 per cent of silver the loss would have been on fine gold in the same time 66 grammes, or 0·33 per cent of the weight of the gold operated upon. Now, when we consider that the silver * and the base metals, so long as they are present, must protect the gold; that before the silver is all gone the process is stopped; that the surface exposed to the action of the chlorine is less in the Miller process; that no chlorine escapes from the pot except towards the end of the process, and that all through the operation a layer of molten chloride of silver, and above that a layer of molten borax, covers the surface of the gold, it is not difficult to understand why the total loss of the process is reported to be only 0·011 per cent to 0·019 per cent, including sweepings, etc. On the other hand, the chlorine acts under considerable pressure in the Miller process, as it has to force its way through the molten gold. This probably accounts for the large amount of double chloride of silver and gold.

Finally, that some of the gold as well as silver is actually volatilized in the Miller process in spite of all the consideration mentioned is evidenced by the fact that the dust from the short horizontal flue was found to assay:

	Ounces.
Gold	0·441
Silver	0·853

I have considered thus at length the principal facts of the Miller process, because they at first sight appear to contradict the results that I have obtained. I think I have shown that they do not. And while the numerical values that I have found will probably be somewhat modified by future and more extensive experiments, I am convinced that the general conclusions that I have drawn will stand.

THE EFFECT OF CHLORINE ON OTHER METALS AT A CHERRY-RED HEAT.

In order to study the effect of chlorine on some of the other metals that accompany gold the following experiments were conducted at a cherry-red heat in the muffle on the same plan as those conducted in the muffle with gold.

Silver.—A button of silver weighing 0·60118 grammes was exposed in a scorifier under the bowl of a new long-stemmed pipe to an atmosphere of chlorine for half an hour at a cherry-red heat, and, therefore, below the melting point of silver. The silver button became immediately coated with a film of chloride of silver which was fused and of a dark brown color. It rapidly increased in thickness, and at the end of half an hour the silver button had greatly decreased in size, but was still contained in the center of the button of fused chloride of silver. On removing the scorifier from the furnace the chloride remained fused for some time, and it was easy to obtain the button of silver nearly free of chloride by letting it roll out of the chloride which remained behind. When the adhering chloride was dissolved off the silver button weighed 0·270 gramme, or, in other words, 53·4 per cent of the silver had been changed into chloride in this time. Evidently, if the button had been smaller, the conversion would have been complete even in this short time. The chloride of silver when cold was colorless and transparent, as usual. Very possibly the chloride of silver when molten has the property of dissolving chlorine; at any rate the chlorine must

* Abstract of a paper read before the American Institute of Mining Engineers, May 1888.

* Two thousand grammes of silver being present.

have been transmitted through a layer of chloride of silver an eighth of an inch thick. Very possibly this molten state of the chloride is the condition necessary for the thorough chlorination of silver in roasting silver ores, and the absence of this condition the reason why silver cannot in many cases be so readily chloridized in the cold. There were evident signs of volatilization of the silver, for the scorifier was coated with a film of a delicate rose or pink color. The amount of this loss was not determined.

Copper.—A button of fine copper, weighing 0·39570 gramme, was treated exactly as above, at the same temperature, etc., in a moderate stream of chlorine. Copious fumes at once issued from the scorifier; these were of a brownish-red color as they rose against the cherry-red background of the muffle walls, but they were of a bluish-white color as they issued from the mouth of the muffle into the open air. They deposited on a cold surface of fire-clay a copious film of a pale greenish-yellow when thin, and of a deep, rich orange-brown when thick. The whole film instantly disappeared when a drop of water was allowed to fall upon it.

In fifteen minutes the copper button had entirely disappeared, and in its place was only a small, dark-colored drop of molten copper chloride. This, when removed from the furnace, partly evaporated in bluish-white fumes, and partly remained in the scorifier as a black crystalline film, which, when cold and wetted with water, turned green.

Iron.—I next took an ordinary wrought-iron tack, which weighed 0·50674 gramme, and treated it in the same manner as the copper at a cherry-red heat, in a moderate stream of chlorine. The iron was also instantly attacked, a dense reddish-brown vapor issuing from beneath the pipe-bowl; this, as it issued from the muffle into the air, still retained its color, and where it deposited itself on cold fire-clay, it was still of the same rich, reddish-brown color. Immediately around the outside of the pipe-bowl and on the inside of the scorifier was a bluish black deposit of minute crystals of magnetite gradually shading off into a reddish deposit of iron-oxide, in which no crystalline form could be discovered with the microscope; 70·3 per cent of the iron was volatilized in half an hour.

Lead.—I next treated lead in the same way, and found a dense cloud of whitish vapor of chloride of lead issue from the furnace, which was still white when deposited on cold surfaces.

The action of chlorine on antimony, arsenic, sulphur, etc., being already too well known to require further experiment, none were made on these substances.

Mr. Stetefeldt, in referring to the losses he found in roasting, in the paper already cited, seems inclined to throw the responsibility of the volatilization of the gold on the presence of chloride of copper, although he states also that the presence of the copper does not appear to be essential. Now it is, of course, possible that the volatilization of the gold is aided by the presence of the more volatile chlorides of copper, iron, lead, etc.; but, in either case, it is the chlorine which is the real cause behind the formation of all these chlorides, and it seems to me that the presence of the copper, iron, lead, antimony, arsenic and sulphur, on account of the greater volatility of their chlorides, and of their greater affinity for chlorine, should rather serve to protect the gold from the attack of the chlorine, and thus serve to reduce its volatility.

At the same time, when no other source of chlorine is present, and these salts are in contact with the gold, it is not improbable that they would share some of their chlorine with the gold, and thus cause its volatilization also. Further experiments are, however, necessary to clear up this point.

THE CONDENSATION OF CHLORIDE OF GOLD FROM A CHLORINE STREAM.

I have already quoted the statement of Mr. Aaron, that the bulk of the material caught in his dust-chambers was not richer than the ore treated. On inquiry, I find this to be generally the case; those who have erected dust-chambers, with the hope of effecting a great saving in this respect, have been usually disappointed, as the dust often assays even less than the ore, and is seldom much richer.

Many metallurgists regard this as a proof that no gold is lost in roasting. This conclusion seems hardly warranted, in the light of the experience recorded by Mr. Aaron, and of the fact that I have frequently found the flue-dust from furnaces, where I know a very large gold-loss to have occured in roasting, to assay very much as the ore did. The true conclusion is, as was, I believe, first suggested by Mr. Aaron, *that the gold is volatilized in a form not easily condensible.*

In my experiments with chloride of gold in the chlorine stream, I have already pointed out that a considerable amount of chloride of gold is condensed when the temperature of the stream is reduced, but I have never been able to condense the whole of it by cooling alone. In fact, I have found it impossible to remove the chloride of gold entirely, so long as the chlorine was present. It seems that, as already quoted from Pratt, a higher and more volatile chloride of gold than $AuCl_3$ forms under these circumstances.

Thus, no matter whether I allowed the stream to pass through a long glass tube exposed to the cooling action of the air, bubbled it through wash water, passed it through charcoal dry and wet, through dry iron nails, or through nails dampened with water, I was able to get more or less of the flame test for gold. The two latter methods with wet charcoal and wet iron nails, however, were effective in removing some of the gold.

But I found that, in order to remove the gold with any degree of efficiency, it is necessary to destroy the chlorine which carries the chloride of gold. Anything which effects this result will do. I have tried several with more or less success. Sulphydric acid does very well, but there is some danger of explosive union of this gas with chlorine, and a considerable quantity of very disagreeable chloride of sulphur is produced, which would render the subsequent extraction of the gold very unpleasant. The reaction which takes place between chlorine, sulphurous acid and water, whereby sulphuric and hydrochloric acids result, may be easily taken advantage of if sufficient time and surface are provided for the reaction to take place efficiently.

In my experiments I found it convenient to use, as a condensation tower on a small scale, a glass jar, 9 inches high by 2½ inches in diameter. Into the bottom of this I introduced a glass tube bearing the chlorine stream charged with gold; by means of another tube I introduced a stream of sulphurous acid generated from copper and sulphuric acid. A tubulature near the bottom allowed water to be added for the gases to bubble through, or for the withdrawal of the same from time to time.

During two hours I passed a very small amount of gold into the condenser, in all:

Sent to condenser	4·83 mg. of gold.
Metallic gold filtered from condenser water	3·46 mg.
Gold precipitated from condenser water by H_2S	0·15
Total gold condensed	3·61 mg., or 74·74 per cent.

In this case, however, whenever the stream of chlorine was much increased, the gold flame began to show itself, showing that sufficient time and surface were not provided for the reaction of the gases to take place.

I next used charcoal, with which the cylinder was filled. This was wetted with water, which was allowed to trickle constantly through it, being withdrawn at the bottom, and replaced from time to time. The gold-bearing chlorine stream and sulphurous acid were introduced, as before, at the bottom of the "tower." In all cases considerable heat was generated by the reaction, the contents of the condenser being rapidly heated nearly to 100 degrees C. In one case the condenser was only partly filled with charcoal, and during the experiment nearly all the gases that were passed to it were absorbed by the water and the charcoal, only a very slight amount of gas of any kind escaping, and no sign of chloride of gold appearing by the flame test, except when the sulphurous acid stream was reduced at the same time that the chlorine stream was increased. So long as the sulphurous acid was in excess no sign of gold flame appeared. After the experiment was over the charcoal was drained on a filter and burned on roasting dishes. Copious fumes of sulphuric acid and hydrochloric acid were set free at first, and considerable decrepitation of the charcoal took place, leading, no doubt, to a mechanical loss of gold. During the condensation, which lasted several hours, there had been:

Volatilized (including that which condensed in delivery tubes, which was accidentally lost, and, therefore, could not be deducted to give actual amount to be charged to the condenser)	21·92 mg. of gold.
Obtained from charcoal ash	14·24 " "
Losses (condensed in tube, not condensed, etc.)	7·68 " "

Or, there was actually saved of the total amount volatilized, 64·92 per cent. If the amount condensed in the tube before it reached the condenser had been deducted, the percentage yield of the condenser would have been still higher.

In another experiment, the condenser was filled with charcoal, 100 grammes being required for that purpose, and the apparatus was fed with a gold-charged chlorine stream for eleven hours, sulphurous acid and water being added as before. No signs of a gold flame were detected during the experiment. The charcoal in the lower part of the condenser became coated with metallic gold.

In roasting this large amount of charcoal, in spite of the greatest care in roasting, considerable decrepitation took place, and no doubt some of the gold contained on the outside of the charcoal was thus lost:

Sent to condenser in eleven hours	67·72 mg. of gold.
Obtained from the ash of charcoal	45·58 " " "
Loss from all causes	22·14 " " "
Actual yield of condenser	67·31 per cent.

Coke was tried in the condenser instead of charcoal, and appeared to work equally well in the condenser, and had the advantage of roasting quietly without any decrepitation. Time did not suffice to push these experiments with coke to a certain conclusion.

Iron was also used in the condenser. In this case the action on the gold is also very effective, provided sulphurous acid and water are present. Considerable heat is evolved, ferrous sulphate and chloride are formed, and usually a little sulphur is set free, probably from the reduction of some of the SO_2 to H_2S, and its subsequent reduction by reaction with SO_2. Very little gas escaped except a little hydrogen, which might, indeed, give rise to explosions on the large scale, unless it were provided against.

In one case cast-iron turnings were used. After passing the chlorine stream charged with gold for several hours, no sign of gold-flame being perceived during that time, the iron turnings were dissolved in dilute sulphuric acid, which took several days, the residue containing graphitic carbon roasted, and then the whole residue assayed.

The total gold volatilized was	46·32 mg.	
Gold condensed on walls of delivery-tube	28·60 "	
Sent to condenser	17·72 "	
Actual yield of iron from condenser	13·94 "	78·67 per cent.
Losses	3·78 "	

In another experiment I took 200 grammes of wrought-iron nails passed in SO_2 and water, and caused the ferrous sulphate and chloride to circulate, by withdrawing it from the bottom of the apparatus and allowing it to drip down from the top from time to time:

The total amount of gold volatilized was	46·98 mg.
Chloride of gold condensed in delivery-tube contained gold	26·00 "
Passed to condenser	20·98 "
Weight of gold obtained after dissolving iron nails	17·98 "
Losses due to all causes	3·00 "

Or, in other words, the actual saving effected by the condenser was 85·70 per cent of the gold sent to it. It is evident from these results that a greater percentage of the gold caught might have been effected by either of these means, if a greater amount of contact surface had been supplied.

The following remarks apply to either of the above described methods. Sufficient surface must be supplied for the contact of the gases, the sulphurous acid must be in excess of the chlorine, and water in sufficient quantity must be supplied to keep down the temperature.

It seems to be effective to circulate the water charged with SO_2, and in the case of iron, with $FeSO_4$ and $FeCl_2$. But this must not be con-

much trouble, though in some instances arrangements must be made to conduct it around the surface breaks.

This method has been in use at Low Moor for about three years. The annual production has been about 50,000 tons of clean ore; or, allowing for loss in washing, more than double that amount of material, all of it from underground mining.

AMBER MINING.

The only place in which amber has been found in paying quantities, says R. Kaldenberg in the *Swiss Cross*, is in the Baltic Sea, and the vein extends from western Russia to Denmark, Norway and Sweden. In former years the production of amber depended principally upon the storms occurring in the winter time, for when the sea was convulsed the amber lying on the bottom was thrown upon the shore; but human enterprise stimulated by the demand for the article has changed all this, and for the last twenty-five years various engineering appliances have been used for getting out the amber in the quickest and cheapest way.

The most profitable strata have been found in the Courischer Haaf, which is located in the vicinity of Memel, and there are twenty large dredging boats constantly at work day and night for eight months in the year. There are large strings of iron pails that are constantly dragging along the bottom of the sea and bringing up the sand and what amber there may be in it. This is emptied on the deck of the ship and there it is washed, and the amber picked out from among the sand and stone.

The little village where this industry is carried on is called Schwartzort. It is situated on a narrow strip of land that extends about ten miles beyond the mainland, and is perhaps a mile wide at its widest part. At one time this strip of land was covered with a forest, but the wood was sold off by a Prussian king in the beginning of this century to the Russians. The land has become barren since stripped of its sheltering forest, and now it is nothing but a sandy waste; and, were it not for the amber industry, this beautiful peninsula would be desolate. About ninety miles further west is another little village, called Palmnicken, and here the amber is obtained in an entirely different manner. The most approved diving apparatus is used, and the divers go out in row-boats, each of which is fitted with an air pump. They go down into the sea, where some of them remain as long as four or five hours. Each diver has a little bag around his neck, and a peculiar hook, with which he pulls up sand, and every piece of amber that he finds is thrown into his bag. An encouragement to the diver is that if he finds a piece of amber he is entitled to a prize of ten, twenty-five or fifty cents, according to the size.

While the divers are below in the sea, engaged in hunting for the amber, the miners are just as busy on land, for it seems that the same stratum of the green sand runs, perhaps for thirty miles or more, into the land. The opening of the mine is perhaps a thousand feet from the shore, and it is necessary to go down about one hundred and fifty feet, which is some thirty or forty feet below the level of the sea. To keep the mine as dry as possible, there are several pumps working day and night; and to prevent the earth from falling in, the passages are propped up by logs of wood. There are about forty miles of passageway in these mines, and there are about seven hundred men employed for the various departments. As soon as a passageway is opened, a track is laid, and on this track there runs a little truck, which holds perhaps half a ton of sand. The miners simply cut out the sand and fill the truck. It is then brought to the surface, where the whole contents is thrown into a long trough filled with rushing water, which separates the sand from the amber, which is caught by nets of various sizes. The amber is then cleaned by machinery, and assorted according to its quality and purity. The writer believes himself to be the first American who ever went down into the amber mine.

ELECTRIC HEATING.

The transmutation of energy into heat with reference to the possibility and practicability of roasting ores by the aid of electricity is a subject that we are often applied to for information upon. There are many instances in mining where there is a considerable water power going to waste which, if it could be utilized to generate sufficient heat by means of a dynamo, would be the saving of a large expenditure in fuel. This problem has not yet been solved, but we are glad to note the first step in this direction, viz., a serious, and we believe practical, proposal to utilize electricity for heating, in a communication by Mr. James Asher to the *Electrical World*, which is so interesting that we repeat it here:

Little has yet been done in heating by electricity. The common belief is that it would be too costly. We can get 60 per cent of the total energy as useful heat from a furnace and but 10 per cent from an electric current derived from a dynamo run by steam. Stoves do most of the heating in towns and they give but one fourth of the total energy in useful heat. Three fourths of the heat passes up the chimney. Air rushes through crevices of doors and windows in draughts which are injurious to health.

Suppose the case of a house heated by electricity in a town. Let the current come from the central station and heat coils of flat iron wire. These coils may each cost less than a dollar, and they may be in any part of the house. For cooking and baking the coils may be placed just under or around the vessel holding the article cooked. Less heat than usual would be required, for no soot would be on the bottom of the containing vessel. The fire risk would be much less than at present, as the wire never need be hot enough to cause fires. The heat supply can be turned on or off instantly; thus there will be no loss of fuel when the need of heat has ceased. This applies with great force to summer use.

In heating, cooking or baking, the temperature can be easily kept uniform. Without rising in the morning, the touch of a button at the bedside will turn heat on several coils in different parts of the house. The nuisance of kindling, smoke, ashes and soot, will be abolished, and no stove pipes and chimneys will be needed.

I have said that we may get 10 per cent of the heat energy expended at the central station, and that in using a stove we may get 25 per cent. When we count the cost of stove pipe, chimneys, scuttles, shovels, ash-sifters, kindling, trouble and great fire risk, I believe electricity will be found the cheaper.

When the dynamo at the central station can be driven by water great economy may be obtained. Water power can be supplied ten hours a day at $20 and steam at $50 to the annual horse-power. In this case steam costs two and a half times as much as water. From my previous statements it will be seen that electric heating would cost two and a half times as much as heating by stoves, and in using water power to generate electricity the heat will cost the same as when produced in stoves, even neglecting the cost of stove pipes, chimneys, etc.

Platinum wire has been used for electric heating, but surely the fact that iron is as good must have been ignored. The conductivity of soft iron is nearly as low as that of soft platinum. The ratio of the temperature of melting ice is as 20·73 to 18 03, and the cost nearly as 1 to 5000. I propose to use flat wire, for better results will be had when the heating surface is large. The coils may be suspended from the ceiling.

THE LOSSES IN ROASTING GOLD ORES AND THE VOLATILITY OF GOLD

By Professor Samuel B. Cristy, University of California.

(*Concluded from page* 284.)

It is evident that the conditions for volatilizing the gold are less favorable in the Miller process than in the experiments that I conducted. For, in the first place, the presence of the silver and the base metals must act to protect the gold as long as they are present, for the affinity of chlorine for these metals is greater than that for gold. Moreover, the gold produced by this process is never absolutely fine. Percy states that the refined gold averaged 993·5 fine, the remaining 6·5 thousandths being silver. It would be interesting to know what the effect of pushing the refining to absolute fineness would have on the gold loss. An appreciable loss would then probably show itself. Next, the surface of the gold exposed in the Miller process is incomparably less in proportion to the mass treated than in my experiments. For in a crucible holding 600 to 700 ozs. (19,000 to 22,000 grammes) of gold the chlorine can only come in contact with the gold by bubbling through it, and it does this only after the base metals and the silver have been removed.

In order, however, to make a more definite comparison, let us see what the loss would be if it were possible to maintain a weight of 20,000 grammes of fine gold in the form of a sphere in a molten state in an atmosphere of chlorine, so that the conditions would be similar to those of my experiments. Now the gold sphere of 20,000 grammes would have a surface 736 8 times as great as 1 gramme sphere, or that of a button of 1 gramme of similar shape. The average of all my experiments above a melting heat, except the last (which was at nearly a white heat), gives for a button of 1 gramme a loss of 3 per cent, or 0·03 grammes in half an hour; hence the evaporation from a button of 20,000 grammes would be 736·8 times as great, or 22 grammes, and as the Miller process lasts about an hour and a half, with gold containing 10 per cent of silver the loss would have been on fine gold in the same time 66 grammes, or 0·33 per cent of the weight of the gold operated upon. Now, when we consider that the silver * and the base metals, so long as they are present, must protect the gold; that before the silver is all gone the process is stopped; that the surface exposed to the action of the chlorine is less in the Miller process; that no chlorine escapes from the pot except towards the end of the process, and that all through the operation a layer of molten chloride of silver, and above that a layer of molten borax, covers the surface of the gold, it is not difficult to understand why the total loss of the process is reported to be only 0·011 per cent to 0·019 per cent, including sweepings, etc. On the other hand, the chlorine acts under considerable pressure in the Miller process, as it has to force its way through the molten gold. This probably accounts for the large amount of double chloride of silver and gold.

Finally, that some of the gold as well as silver is actually volatilized in the Miller process in spite of all the consideration mentioned is evidenced by the fact that the dust from the short horizontal flue was found to assay:

	Ounces.
Gold	0·441
Silver	0·853

I have considered thus at length the principal facts of the Miller process, because they at first sight appear to contradict the results that I have obtained. I think I have shown that they do not. And while the numerical values that I have found will probably be somewhat modified by future and more extensive experiments, I am convinced that the general conclusions that I have drawn will stand.

THE EFFECT OF CHLORINE ON OTHER METALS AT A CHERRY-RED HEAT.

In order to study the effect of chlorine on some of the other metals that accompany gold the following experiments were conducted at a cherry-red heat in the muffle on the same plan as those conducted in the muffle with gold.

Silver.—A button of silver weighing 0·60118 grammes was exposed in a scorifier under the bowl of a new long-stemmed pipe to an atmosphere of chlorine for half an hour at a cherry-red heat, and, therefore, below the melting point of silver. The silver button became immediately coated with a film of chloride of silver which was fused and of a dark brown color. It rapidly increased in thickness, and at the end of half an hour the silver button had greatly decreased in size, but was still contained in the center of the button of fused chloride of silver. On removing the scorifier from the furnace the chloride remained fused for some time, and it was easy to obtain the button of silver nearly free of chloride by letting it roll out of the chloride which remained behind. When the adhering chloride was dissolved off the silver button weighed 0·270 gramme, or, in other words, 53·4 per cent of the silver had been changed into chloride in this time. Evidently, if the button had been smaller, the conversion would have been complete even in this short time. The chloride of silver when cold was colorless and transparent, as usual. Very possibly the chloride of silver when molten has the property of dissolving chlorine; at any rate the chlorine must

* Abstract of a paper read before the American Institute of Mining Engineers, May 1888.

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have been transmitted through a layer of chloride of silver an eighth of an inch thick. Very possibly this molten state of the chloride is the condition necessary for the thorough chlorination of silver in roasting silver ores, and the absence of this condition the reason why silver cannot in many cases be so readily chloridized in the cold. There were evident signs of volatilization of the silver, for the scorifier was coated with a film of a delicate rose or pink color. The amount of this loss was not determined.

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Actual yield of condenser	67·31 per cent.

Coke was tried in the condenser instead of charcoal, and appeared to work equally well in the condenser, and had the advantage of roasting quietly without any decrepitation. Time did not suffice to push these experiments with coke to a certain conclusion.

Iron was also used in the condenser. In this case the action on the gold is also very effective, provided sulphurous acid and water are present. Considerable heat is evolved, ferrous sulphate and chloride are formed, and usually a little sulphur is set free, probably from the reduction of some of the SO_2 to H_2S, and its subsequent reduction by reaction with SO_2. Very little gas escaped except a little hydrogen, which might, indeed, give rise to explosions on the large scale, unless it were provided against.

In one case cast-iron turnings were used. After passing the chlorine stream charged with gold for several hours, no sign of gold-flame being perceived during that time, the iron turnings were dissolved in dilute sulphuric acid, which took several days, the residue containing graphitic carbon roasted, and then the whole residue assayed.

The total gold volatilized was	46·32 mg.	
Gold condensed on walls of delivery-tube	28·60 "	
Sent to condenser	17·72 "	
Actual yield of iron from condenser	13·94 "	78·67 per cent.
Losses	3·78 "	

In another experiment I took 200 grammes of wrought-iron nails passed in SO_2 and water, and caused the ferrous sulphate and chloride to circulate, by withdrawing it from the bottom of the apparatus and allowing it to drip down from the top from time to time:

The total amount of gold volatilized was	46·98 mg.
Chloride of gold condensed in delivery-tube contained gold	26·00 "
Passed to condenser	20·98 "
Weight of gold obtained after dissolving iron nails	17·98 "
Losses due to all causes	3·00 "

Or, in other words, the actual saving effected by the condenser was 85·70 per cent of the gold sent to it. It is evident from these results that a greater percentage of the gold caught might have been effected by either of these means, if a greater amount of contact surface had been supplied.

The following remarks apply to either of the above described methods. Sufficient surface must be supplied for the contact of the gases, the sulphurous acid must be in excess of the chlorine, and water in sufficient quantity must be supplied to keep down the temperature.

It seems to be effective to circulate the water charged with SO_2, and in the case of iron, with $FeSO_4$ and $FeCl_2$. But this must not be con-

tinued till the water becomes saturated with the H_2SO_4 and HCl in the case of charcoal, or with Fe_2Cl_6 in the case of iron. If this is done, the action seems to be deleterious, as the water loses its power to dissolve and decompose the gases SO_2 and Cl.

Charcoal and coke are cleaner than iron, as no sulphur is set free by their use. If a sufficient amount is used to give contact surface enough, they will probably prove as effective as iron. If charcoal is used, the greatest care must be taken in roasting it, to avoid a mechanical loss of gold. Coke has the advantage over charcoal in this respect, and also in furnishing less obstruction to the draft, and also in suffering less from crushing. Particular care must be taken that the water used does not get surcharged with sulphuric acid, or the efficiency of the condenser will be at once found to suffer.

Although iron will, perhaps, prove more expensive than charcoal or coke, the fact that a great quantity of waste iron accumulates about a mill will, perhaps, render its use possible. The value of scrap iron to the chlorinator has already been established in precipitating the gold still left in the leaching waters after ferrous sulphate has apparently thrown down all the gold. In addition to the cement copper, for which this iron was originally used, enough gold is obtained to make a saving of several thousand dollars in the course of the year. If iron is used for condensation, it should be so placed as to offer the most surface to the gases, and to yield the least obstruction to the draft. It would, probably, be possible to obtain most of the gold by sluicing out the condenser from time to time and either settling out the gold or filtering it. It would not be necessary to remove the scrap iron, or to dissolve it in sulphuric acid, as I had to do; it would only be necessary to add more scrap iron at the top from time to time to supply the waste.

The chief difficulty that would have to be met in applying either method would be in constructing a condensing tower that would resist the action of the hot acid gases and water. I think, however, that this need not prove an insuperable obstacle, if the tower is built of ordinary brick laid in a mixture of dry sand and tar, instead of lime mortar, and this is lined with fire-bricks of the best quality which have been boiled in a mixture of asphaltum and coal-tar of proper consistency so that the coating will not run when heated to the temperature of, say, boiling water. These bricks if laid while still hot will make tight joints without mortar, but if they are laid cold may be joined acid-tight by means of hot asphaltum of proper consistency. If properly built, such a tower ought to give very little trouble from acid waters. (Some excellent hints on this subject are given in the ENGINEERING AND MINING JOURNAL, May 26th, 1888, by Dr. Francis Wyatt, in his article on "The Development of the American Chemical Industry.") It will be necessary, however, not to use too much coal-tar in the mixture or the lining will soften in spite of the water present and cause the gold, etc., to adhere to the walls, making a very disagreeable mass to clean up. Probably an experimental tower could be made of wood or an old leaching tank if it were well protected by asphaltum.

If charcoal or coke were used it would be necessary to provide means for charging these substances at the top, and for withdrawing them at the bottom, from time to time, when their gold content was to be extracted.

It would also be necessary to provide an artificial draft to draw the fumes through the condenser.

A Guibal fan or a Root blower, constructed mainly of wood and thoroughly painted from time to time with asphaltum and coal-tar, would serve the purpose here as it does in connection with quick silver condensers, where they are equally exposed to the attack of acid waters. The source of power (in Northern California, at least, where water under a high head would most always be available), would most conveniently be a small Pelton wheel, and the additional expense incurred almost nominal. Where water-power was not at hand it might be found best to use the condenser only at such times as salt was added to the ore, as the volatilization loss at other times would be probably very small. It is, of course, evident that an abundant supply of SO_2 should be produced at such times as the salt was added on the finishing hearth, so as to aid in the condensation of the gold from the roasting ore on the upper hearths. The condensation waters that issue from the condenser should be filtered, after being allowed to settle, through a box containing charcoal so as to extract all suspended gold.

Whether or not such a condensing plant as I have sketched could be made to pay for itself on the working scale will depend on further experiments on a larger scale than any I have had the means of making. The results that I have obtained, however, are, it seems to me, sufficiently encouraging to warrant the attempt being made on not too extensive a scale at first, with such ores as are found to give too great a gold loss in roasting. The same appliances, somewhat modified, would probably serve as a valuable attachment to the dust chambers of silver roasting furnaces.

CONCLUSION OF THE CONDITIONS THAT REDUCE THE GOLD-LOSS IN ROASTING TO A MINIMUM.

In justice to the metallurgists of California, I should not neglect to add that the case of the excessive loss above cited is not to be taken as a type of the work that is done in treating such gold ores. It is, however, through just such expensive mistakes as the one instanced that the good results now common have been reached.

In April of this year (1888) I visited Nevada City for the purpose of learning the conditions of treatment that obtain at the present time. The only chlorination works then in operation at this place were those of Mr. Maltman and that at the Merrifield mine, in charge of Mr. Stansfield. Both these works have favorable reputations. In addition there are other competing works at Grass Valley. While I have had no time or opportunity to determine for myself the exact yield at these works, the fact that they compete in the open market, charging from $15 to $17 for treatment according to size of lots, etc., and guarantee a yield of 90 per cent of the gold and 60 per cent silver contents of these sulpherets would seem to indicate that they do exceedingly good work in roasting, and that they have arrived at the conditions which reduce these losses to a minimum.

Here the old-fashioned long furnace with a single step separating the finishing hearth from the rest of the furnace is still the favorite furnace. The total lengths of the hearths being from 55 to 65 feet by 10 feet wide. The furnaces hold from 6 to 9 tons and usually produce about 3 tons per day, so that a lot of ore is in the furnace from two to three days at a time. The custom now is to charge the salt after a long oxidizing roast at a dull red and ending with a low cherry-red, where, as the ore reaches the finishing hearth, and the sulphur has been very thoroughly oxidized, the salt is added, the temperature of the furnace being slightly lowered at the time. The salt is stirred thoroughly into the ore, and as soon as it has become "dissolved" by the roasted ore, which takes about half an hour, it is drawn into the cooling pit.

After the experiments showing how the volatility of the gold in the presence of chlorine is increased by even a slight increase of temperature above a red heat it will be readily understood how important an influence this lowering of the temperature, when the salt is added, has on reducing the gold loss.

It must also be evident that since the ore remains in the furnace for from 48 to 72 hours, that time is not the most important factor in causing the loss. Of course, if salt were present all this time the result would be probably somewhat different.

This brings me to a point that is well worth clear statement, as I have never seen it mentioned before.* I have already shown that in all the muffle tests that I have made I found that with a given percentage of salt the loss of gold was invariably less when the salt was mixed with the ore at the start, than when it was mixed with the ore after a long oxidizing roast.

I have already discussed this at some length. I thought at first that this result was due to a mechanical loss caused by the decrepitation of the salt added to the hot ore; this cause was, however, carefully eliminated by fusing, and then pulverizing the salt and adding this dried salt carefully to the ore after it had slightly cooled. The result was the same. The real reason is apparent; it is that when the salt is added at the start, the chlorine is partly used in volatilizing the sulphur, and so adding a given amount of salt at the start, as far as the gold loss is concerned, is practically equivalent to adding a less amount of salt after a long oxidizing roasting. Hence, whenever a batch of ore is treated at a time and a continuous process is not used it is natural to expect a greater loss of gold when the salt is all added after a long oxidizing roast. But as it is well known that the reverse procedure gives the least loss of gold in continuous roasting on a large scale, as has been pointed out by Mr. Aaron, it is worth while to ascertain the reason why.

The reason of this difference puzzled me for a long time; it is, however, undoubtedly due to the fact that in the muffle experiments, and in fact to all batch roasts in the reverberatory furnace or otherwise, where the whole lot of ore is kept at the same temperature throughout, when the gold chloride has once formed and left the batch of ore, that is the last of it as far as that sample of ore is concerned; hence the more chlorine set free after the gold becomes exposed to it the greater the loss. Hence, adding salt at the end produces a greater loss of gold. Now, when the ore is treated continuously in the long hearth reverberatory furnace it is not all kept at the same temperature, but it is red hot at one end and dark at the other; hence excellent conditions are maintained for condensing the gold chloride set free at the hot end by the cold ore still containing sulphur at the other Now, if salt is all added at the start there is a continued volatilization of chloride of gold all through the furnace, and a less favorable opportunity for it to condense, while if, on the other hand, the salt is all added at the hot end at the finishing hearth, although a rapid volatilization of gold takes place there, it has a chance to condense by coming in contact with the long surface (some 30 feet) of unsalted cooler ore; some of this is yielding SO_2, and with the steam from the burning fuel offers excellent means for reduction of the chloride of gold right within the furnace, but the most efficient means probably is the pyrites themselves.

In order to test the truth of this assumption, I passed a gold charged chlorine stream over one sixth assay ton of Murchie pyrite, which originally contained 0·75 mg. of gold. On gently warming the pyrite a most vigorous combination took place between the gold and the chlorine stream, brilliant luminous clouds of scale of a micaceous appearance filling the tube. These proved afterward to be anhydrous chloride of iron; chloride of sulphur was afterward formed; no gas escaped from the tube except when the chlorine stream was urged, then the gold flame became apparent. The total amount of gold volatilized and sent to the pyrite was 5·19 mig. Much of this escaped condensation, for the ore after treatment (which by the way was a very uncomfortable mass of hygroscopic chlorides of iron, sulphur, etc.), assayed 3·30 mg. of gold. Now the original content of gold in the ore was only 0·75 mg., hence the gold content of the ore had increased, owing to this cause, more than 300 per cent. Of course, this is an extreme case, but it shows how important a part the condensation of this volatilized chloride in the furnace itself may play in reducing the gold loss. That there is something in this on a large scale is evidenced by the fact which I have always observed, that where the upper hearth was kept at a red heat there was a considerable loss of gold when salt was used, and that where the best results have been obtained the upper end of the hearth was kept below a red heat for a distance of fifteen or twenty feet.

I think I have said enough to show what a delicate process the chloridizing-roasting of gold ores is; how easy it is to incur enormous losses of gold by inattention to what may appear insignificant trifles; and how necessary in such matters is a systematic weighing and sampling, as well as assaying of the ores and products, in order to know at once when such losses are taking place, so as to be able at once to check them. The remarks on this latter head made in Mr. Daggett's paper on the Russell Process (*Trans.*, xvi., 363) are certainly worthy of careful consideration. To my certain knowledge, considerable losses have taken place through lack of attention to these simple matters of ordinary routine. Hap-hazard and occasional sampling and assaying are worse than useless. They lead to great losses of valuable capital, frequently to the total abandonment of good properties, and, worse than all, to a false sense of self-satisfaction that discourages improvement by denying its necessity.

* Mr. Geo. J. Rockwell has recorded a similar result on the large scale with *silver ores* at Las Yedras, Mexico.—ENGINEERING AND MINING JOURNAL, Vol. XLV., p. 159.

Triple Screws for Torpedo Boats.—The Italians have improved on the twin screw of modern steamships by the addition of a third screw moved by a separate shaft and set of engines. The three screws are placed in the angles of a triangular pyramid.

A General Antidote for Poisons is a mixture composed of equal parts of calcined magnesia, wood charcoal, and hydrated oxide of iron, with a sufficient quantity of water. It is, as a harmless and simple remedy, applicable in such cases when the nature of the poison is unknown.—*Rundschau*, 1888, p. 15.

Progress in Chili.—The Republic of Chili, with a population of only about 3,000,000, is making great progress. The last report of the Chilian Secretary of the Treasury shows that during the last ten years the revenue and foreign trade of the country have more than doubled. The government, which in 1866 could count upon a revenue of little more than £1,800,000, and in 1877 upon a revenue of little a under £3,400,000, anticipates a revenue of £7,200,000 for 1888.

Improved Ordnance.—The Elswick Ordnance Company, Lord Armstrong's, has perfected a 4¼-inch breech-loader, from which ten rounds were fired in 47½ seconds. A six-foot target 1000 yards away was struck five times running in 31 seconds. With this startling improvement in gunnery comes a new powder from the Chilworth Company, which, with a charge weighing a third less, a velocity of nearly 2400 feet per second is obtained, as compared with 2000 feet with other powders.

A Coke Screening Machine.—The J. M. Schoonmaker Coke Company, of Pittsburg, Pa., have recently placed in one of their works in the Connellsville region a new coke-crushing machine, of which the following is a brief description: In place of the coke passing through a revolving shaft, as is the case with the coke crushers now in operation, with the new crusher it will pass over a number of screens so arranged that all the dust will be kept out of the coke. The different sizes will fall into bins ready for shipment, entirely free from any dust whatever.

Light Without Heat.—In a recent article in *Nature* Dr. Lodge alludes to the possibility of obtaining light without heat. The vibrations giving rise to the sensation of light range from 7 to 4 billions per second, which at present we can produce only by producing at the same time all the vibrations of lower pitch, which requires a great expenditure of energy, and are absolutely useless; the question is, therefore, how to produce the useful vibrations and not the others. This problem has not yet been solved, but Dr. Lodge evidently considers that it is not *à priori* impossible of solution.

Poteline is the name of a mixture of gelatine, glycerine and tannin, to which sulphate of barium, or of zinc, may be added, and which may be colored by vegetable colors. It may be kneaded while warm. When cold it may be used for numerous purposes. It can be turned, filed, bored, polished, and can be used for hermetically sealing bottles, etc. The proportion of ingredients varies according to the uses. For sealing bottles, of course, it must be used liquid. Potel, the inventor, uses it with success for preserving meat, by applying it liquid, at a temperature of 50–60 degrees C.

Submarine Telephony.—The French have made experiments in submarine telephony at Brest. The instrument used is the invention of M. Barrare, who has called it the hydrophone, which, roughly speaking, is simply an ordinary microphone, arranged so as to equalize the water pressure in both sides of the diaphragm. The experiments have to a certain extent been successful, as under the most favorable conditions the sounds produced by such instruments as bells, whistles and trumpets, were heard at a distance of 5700 yards. When the experiments were made on a ship in motion the results were not so good, though the sounds were clearly heard at a distance of 1500 yards.

Mineral Production of New Zealand.—From a return recently issued it appears that in spite of a reduction of £92,000 under the head of gold, the mineral products of New Zealand in 1887 exceeded in value the output of 1886. The year's output of coal was 558,620 tons, or an increase of 24,267 tons. The export of coal was 43,719 tons, of the value of £44,143, or a decrease of £8000, and of coke 183½ tons, valued at £266. The coal consumed in the colony last year was valued at £257,451. Of manganese ore, 305 tons, valued at £895, were raised, and of antimony the production was 134 tons, of the value of £3959, an increase over 1886 of nearly 100 per cent. The production of gold in 1887 was valued at £811,100, and of silver at £3453.

Movement of the Precious Metals for the Year Ending August 31st, 1888.—Colonel Switzler, Chief of the Bureau of Statistics, in his second monthly statement for the fiscal year ending June 30th, 1888, corrected to September 22d, shows the following movement of gold and silver for the year ending August 31st:

Exports—Gold, domestic	$5,485,530
Gold, foreign	4,657,808
Total, gold	$20,143,338
Silver, domestic	16,951,759
Silver, foreign	12,742 556
Total, silver	$29,694,315
Gross total exports gold and silver	$49,837,653
Imports—Gold	$36,333,178
Silver	14,774,099
Gross total imports gold and silver	$51,107.274
Excess of imports over exports, gold and silver	$1,269,621

This shows a balance of exports over imports of silver of $14,920,219, and that such excess of silver was used to pay foreign obligations.

For the corresponding year of 1887 we exported $26,226,276 of silver and imported $17,428,728, being an excess of export over import of silver of $8,807,549.

The increased export of 1888 over 1887 is, therefore, $6,112,671.

Joly's Meldometer.—The meldometer of Mr. John Joly, of Dublin, is a simple instrument for observing the behavior of bodies at high temperatures, melting points, etc. The instrument fits the stage of a microscope, and consists of a platinum strip stretched between two clamps; a little of the material in a state of powder is put on the strip, a current is sent through it, and the resistance of the system adjusted until melting or boiling ensues. A carbon-rod of more than a foot in length is placed vertically in a glass tube, and mercury enters the tube from below when a small reservoir connected with the tube by a piece of india-rubber pipe is lifted; thus part of or all the carbon is cut out. A tap further serves to arrest or discharge the mercury. It is easy to melt quartz and other refractory material on this platinum strip. The melting points of minerals stated in such text-books as Dana's, appear to be frequently erroneous: garnet, for instance, often referred to as a standard, behaves so differently as to render its use altogether unreliable. The real temperature of the heated strip may be calculated by Siemens' law; thus beryll melts at 968 degrees Cent. Even if these temperatures should not be correct, however, the figures have a relative value and may be checked later on, as Professor Fitzgerald suggested. For example, it is easy to arrange two strips parallel to one another, and to watch which of the two minerals melts first. At any rate, the instrument is a material improvement upon the rough melting test by means of the blow-pipe. It can further be employed to examine sublimates during and after formation. The strip is in this case placed between two covering glasses. Under these conditions it will be noticed that with certain compounds the volatile metal is first affected, forming a black deposit—as in the case of arsenic—surrounded and covered at high temperatures by white oxide. Selenite of lead first produces a pink selenium eye, which soon becomes clouded over by yellow lead oxide; if looked at from behind, or if held before a screen, the sublimate still shows the pink selenium center. Some sublimates change color. Mr. Joly exhibited some pretty sublimates which deserve the attention of the mineralogist and chemist.

Electrical Production of Diamonds.—The Hon. C. A. Parsons describes in an interesting communication to the Royal Society, which is published in abstract in *Engineering*, a number of experiments which he has recently made on carbon at high temperatures and under great pressures, and in contact with other substances. The primary object of the experiments was to obtain a dense from of carbon for use in arc and incandescent lamps, for, as it is well known, could the life of the carbons of either variety of lamp be prolonged, a considerable economy could be effected in electric lighting. Looking at the experiments from this point of view, it may be stated that the experiments were not entirely successful, though a very dense form of carbon was in one case obtained, but nevertheless some results are of very great interest, as, though the author expresses himself very cautiously, it would appear that he has succeeded in producing diamond dust artificially. The arrangement of the experiment was as follows: A massive cylindrical steel mold of about 3 inches internal diameter and 6 inches high was placed under a hydraulic press; the bottom of the mold being closed by a spigot and asbestos rubber packing—similar to the gas check in guns; the top was closed by a plunger similarly packed, this packing was perfectly tight at all pressures. In the spigot was a vertically bored hole into which the bottom end of the carbon-rod to be treated fitted; the top end of the carbon-rod was connected electrically to the mold by a copper cap, which also helped to support the carbon-rod in a central position. The block and spigot were insulated electrically from the mold by asbestos, and the leading wires from the dynamo being connected to the block and mold respectively, the current passed along the carbon-rod in the interior of the mold. The free space in the mold was filled in turn with different hydro-carbons and with other materials. Amongst the liquids acted on were benzine, paraffin, treacle, chloride and bisulphide of carbon, and the solids included silica, alumina, carbonate, and oxide of magnesia and alumina. The pressure employed ranged from 5 to 30 tons per square inch. In the experiment with silica the density of the carbon was increased 30 per cent, and in no other case. The most interesting set of experiments was when the mold around the rod was filled with a layer of slaked lime about a ¼-inch thick, surmounted by 2 inches of silver sand, followed by a layer of lime of the same thickness, and finally by a layer of coke dust. The pressures used ranged from 5 to 30 tons, and the current from 200 to 300 ampères, the carbon being in different experiments from ¼ inch to $\frac{5}{16}$ inch in diameter. Under these conditions there was obtained on the surface of the carbon-rod a powder of a gray color, harder than emery, and capable of scratching the diamond. This powder is, therefore, very probably the diamond itself.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in another part of the Journal.]

Alfred Krupp: A Sketch of His Life and Work. After the German of Victor Niemeyer. By K. W. and O. E. Michaelis, Kennebec Arsenal. To which is added *A Visit to the Krupp Works at Essen.* From the French of Capt. E. Monthaye. Translated by Capt. O. E. Michaelis. Published by Thomas Prosser & Son, New York. 1888. Pages 72. Illustrated.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred subjects, issued by the United States Patent-Office.

PATENTS GRANTED OCT. 9TH, 1888.

390,717. Hydraulic Ore-Sizer. James Symons, Ilse, Colo., Assignor of two thirds to John B. Sampson, same place, and John N. Palmer, Denver, Colo.
390,755. Ore Concentrator and Amalgamator. John D. Coplen, Denver, Colo.
390,757. Oil Vaporizer and Burner. James A. Cowles, Chicago, Ill.
390,770. Pipe-Joint. Francois J. Garnier and Nicholas Curé, Brussels, Belgium.
390,785. Fore-Hearth for Lead-Smelting Furnaces. William A. Koneman, Magdalena, N. Mex.
390,810. Apparatus for Forming Compressed Steel Ingots. William H. Singer, Allegheny, Pa.
390,847. Water-Wheel. William C. Edwards, Holyoke, Mass.
390,852. Talc-Pulverizer. Abner G. Gillette, Atlanta, Ga.
390,861. Casting Metal Ingots. John Illingworth, Newark, N. J.
390,895. Manufacture of Chlorine. Alfred R. Pechiney, Salindres, Gard, France, Assignor to the Weldon's Chlorine Process Company (Limited), Westminster, England.
390,927. Apparatus for Purifying Feed-Water. Warren Webster, Philadelphia, Pa.
390,937. Blast-Pipe. Henry Appleby and John G. Robinson, Limerick, Ireland, said Robinson Assignor to said Appleby.
390,964. Stack-Furnace for Reducing Ores. Abraham T. Hay, Burlington, Iowa.
390,969. Mode of Converting Cast-Iron into Steel. Josephus Hooper, Louisville, Ky., and Thomas Clark, New Albany, Ind.
390,972. Alloy. Joseph Hurych, Brooklyn, N. Y.

THE METALLURGY OF STEEL.*

By Henry M. Howe.

(*Continued from page* 287.)

I attempt in Table 86 to condense his views on the fracture, etc., of different parts of bars thus treated, set forth fully in the Metallurgical Review, I., p. 245.

He points out that the rate of cooling *from the melting point* influences the size of grain greatly, slow and rapid cooling yielding large and small crystals respectively.

The minor differences between his views and Brinnell's we may reasonably refer to the searchingness of the latter's investigation, bringing out details which in common practice would escape notice.[a]

B. Chernoff in the main anticipated Brinnell's general conclusions regarding structure, besides reaching other important ones which lay outside the field of the latter's researches, yet naturally failing to note important distinctions which the subtle experiments of the Swedish investigator have brought to light. In certain diagrams, which I have rotated 90° in Figure 63 to facilitate comparison with Brinnell's, (Figure 61) he indicates four points which apparently coincide with Brinnell's cold, V, W, and the melting point. His *a* is a dark cherry-red, his *b* a "not brilliant" red. These temperatures are slightly below those of Brinnell's V and W, but not more than may be readily due to the probable difference between the steels which these two observers employed. Chernoff points out that, the higher the carbon, the lower are these points. He employed an ordinary hard steel, which we may suppose had between ·75 and 1 00% of carbon. For very soft steel he puts *b* at a white heat. Brinnell, on the other hand employed a steel with 0·52% of carbon, whose W would stand between the "not brilliant red" and the white of Chernoff's hard steel and very soft steel, or just about where Brinnell places it, at a low yellow.

His chief results are as follows.

1. Steel cannot be hardened below V.

2. Between X and W heating and cooling, fast or slow, affect the structure little if at all.[b] Very protracted exposure to temperatures approaching W, however, probably gradually alters the structure,[c] though he could observe no change on exposing steel bars for about eight hours to temperatures near W.

3. As soon as the temperature reaches W the structure changes rapidly from granular or crystalline to amorphous.[d]

4. With *rising temperature* it remains amorphous up to the melting point.[d]

5. *Falling temperature* between W and the melting point induces crystallization, the more powerfully the higher the temperature, so that, as the descending temperature approaches W, the strength of the tendency to crystallize falls off sharply, as sketched by the abscissæ of the curve in Figure 63. This crystallization makes the metal very tender as long as the temperature remains high.

His remarks suggest that coarse crystallization does not occur at *stationary* high temperature: but I do not find that he states this directly.

6. If steel thus made tender be again cooled completely, the individual crystals, if they have not been parted mechanically at the high temperature, become so strongly coherent that fracture now occurs across their bodies, and not along their faces.

The last two propositions are not distinctly enunciated by Chernoff. They give his views as I understand them, and the reader must allow for refraction.

Table 86.—Metcalf's Views on the Influence of the Quenching-Temperature on the Fracture, etc.

Number	1.	2.	3.	4.	5.	6.	7.	8.
Quenching-temperature	Scintillating.	White.	Bright yellow.	Orange.	Bright red.	Red.	Low red.	Black.
Properties of the Quenched Metal.								
Hardness	Scratches glass.	Extremely hard.			Well hardened.		Hard enough for tap teeth.	Not hardened.
Brittleness	Like glass.	Almost like glass.	Slightly tougher than 2.	Tougher than 3.	Tougher than 4: breaks easily.	Stronger than 8.		
Fracture	Coarse: very lustrous: yellowish.	Coarse: less yellow than 1.	Finer than 2: fiery.	Slightly finer than 3: fiery.	Same size as 8, but fiery. Finer than 4.	Much finer: not fiery: refined.	Edges refined middle coarser.	Coarser than 6 and 7: the original grain.
Specific gravity	7·729		7·748		7·761	7·787	7·804	7·825

§ 249. Discussion of Chernoff's Views.—The first three propositions accord with the results of Brinnell and of others.

The first agrees with Brinnell's observation that, if previously annealed steel be quenched from V or even from V+, its carbon remains wholly cement and it retains the cement-carbon hackly fracture: and with mine (p. 12), that no readily perceptible increase in hardness is produced by quenching from below dull redness, though as the quenching temperature rises still farther the hardness increases suddenly.[e]

* Copyright by the Scientific Publishing Company, 1887.

[a] Rejecting the carbon-theory of hardening, he says of Brinnell's fracture-results, "the results given, as far as they can be explained in words, agree with our shop experience, and they indicate clearly what has long been an axiom with us, *i. e.* that a fracture of steel always indicates the highest temperature to which the steel was last subjected, no matter how it may have been cooled, provided it had not been hammered or rolled, or otherwise worked mechanically." Op. cit., p. 385. Mr. Metcalf quotes me (Idem., p. 389) as saying that slow cooling always produces coarse crystals, and quick cooling fine ones. I think he must have quoted from memory, for I do not believe that I have ever written so dogmatically and unqualifiedly on this point. He probably refers to my statements in this journal, pp. 315, 332, April 30th and May 7th, 1887, which, though incomparably less sweeping, I now regard as overstatements. I, like many, was misled by Chernoff's statements.

[b] "Quand la température s'eleve de o à b (W) la texture de l'acier est invariable." "L'acier, chauffé en dessous de b ne change pas de structure, qu'il soit refroidi brusquement ou lentement." Rev. Universelle, 2d ser., I., p. 402, 1877.

[c] "Toutefous, cette expression doit être prise sous cette reserve." "En ce que concerne l'état d'un acier chauffé et par suite ramolli, surtout à des temperatures voisines de B, il est probable que le changement de texture sera plus grande.' Loc cit.

[d] "Aussitôt que la temperature a atteint le point B, l'acier passe rapidement de l'état grenu ou crystallin à l'état amorphe, qu'il conserve jusqu'à son point de fusion." Loc. cit.

[e] Metcalf indeed states (op. cit., p. 384), that a hardening effect is produced by quenching from 100° C., and that quenching from any temperature above that of the atmosphere produces appreciable hardening: but this appears to be due to a disheartening confusion of ideas. Because quenching produces both hardness and stress, the latter altering the metal's density, we are not to infer that hardening and stress are one, or that one is necessarily a measure of the other: they are two distinct effects of a single cause. Professor Langley's experiments, on which Mr. Metcalf's remarks appear to be based, proved that the density was lowered by quenching from 100° C., but they threw no light whatsoever on the effect of that quenching on the hardness, strength and ductility of the metal. All the evidence goes to show that, while quenching from low temperatures causes stress, no important change of hardness occurs until the quenching temperature rises above V. The increase of hardness agrees closely with the change in the condition of carbon, a change so well established as to be no longer open to question.

It is, indeed, by no means improbable that slight changes in hardness proper

The second agrees exactly with Brinnell's results as regards the cement carbon fractures A, B, C, and pretty closely as regards the porcelanic F, which changes comparatively little at temperatures below W, but not as regards the coarse crystalline D, which according to Brinnel becomes dull-amorphous at H. But, as D is only rendered visible by unusual treatment, there is little doubt that the change which it suffers at V escaped Chernoff's observation.

The *third* agrees exactly with Brinnell's and Metcalf's results.

For the *sixth* (pardon the inversion) I find no evidence. I am tempted to ascribe it to heterophasia or to error in translation, for it is certain that the brittleness of overheated steel and its tendency to break with sharp, well-defined crystals does in a measure survive cooling.

The *fourth* and *fifth* contain what I regard as an extremely serious error, to wit, that coarse crystallization does not set in while the temperature is rising. I first offer evidence in rebuttal, and then point out certain possible reasons for Chernoff's statement.

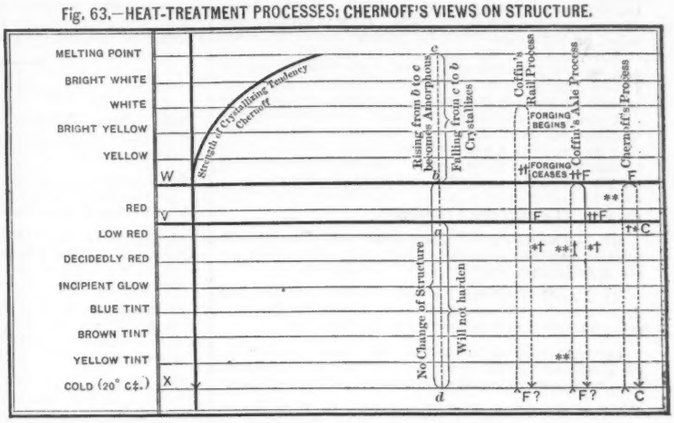
1. In Brinnell's experiments 5, 22, 38 and 45 (Figure 61) the fracture is granular-crystalline, E, and in his 6, 23, 39 and 46 it is coarse granular-crystalline, D, when steel is quenched immediately after slow rise of temperature.

2. In the following experiments I compared the fractures which followed slowly rising with these which followed slowly falling temperature.

A. A bar of hard open-hearth steel 0·37 inch square was cut into three pieces each two feet long. These were placed in contact with each other, imbedded in pulverized fire clay, and heated at one end to dazzling whiteness, the remainder being heated solely by conduction. The first and second were drawn and quenched after 160 and 320 minutes respectively. The third was cooled extremely slowly by allowing the fire to burn out gradually, while the bar remained undisturbed and still imbedded in the hot clay. Thus the first bar should record the structure at different temperatures during rising temperature, the second when the temperature was nearly stationary, the third the structure induced by slow cooling from these various temperatures.

Fractures made at points 0·5 inch apart formed a series in each bar like that of Metcalf's experiment, Figure 62. The first two had, at about the same points in their length, the characteristic porcelanic or refined fracture F. In the third this was replaced by a fine crystalline fracture, which I take to correspond to Brinnell's C. But the

Fig. 63.—HEAT-TREATMENT PROCESSES: CHERNOFF'S VIEWS ON STRUCTURE.



important point is that the highly heated portions of the three bars gave fractures with nearly the same degrees of coarseness.

B. Two pieces of the same steel were heated in white-hot pulverized fire clay in a muffle for 90 minutes: then one was withdrawn and quenched to dull redness, then replaced against the other till, by transfer of heat, their temperatures became apparently identical: both were then quenched. Here the conditions were the same, except that the temperature of one had been rising, that of the other falling, immediately before quenching. According to Chernoff the former should have been porcelanic, the latter crystalline. I could detect no difference in the coarseness of their fractures with a lens, nor could Mr. F. L. Garrison with the microscope.[a] Similar results were obtained in many other experiments.

3. In the following experiment of Coffin's coarse crystallization was acquired without slow cooling: but the experiment does not show directly whether the coarse crystallization which arose was acquired during rising or during stationary temperature, or, as is more probable, during both. Two pieces of steel, 1 and 2, containing 0·4% of carbon, cut from the same bar 1 inch by 4 inches, were both held during 30 hours at temperatures which varied between low whiteness and a point very slightly lower. 1 was then quenched in oil, while 2 was cooled slowly to W and then quenched. The fracture of 1 was but slightly finer than that of 2.[b] Both were coarse crystalline.

Seek we now explanations of Chernoff's statements.

1. The context indicates that they are based in large part on the analogy of the crystallization of certain hydrated salts. As I understand him, there is quite a range of temperature above the melting point of alum, that point at which the crystals dissolve in their own water of crystallization, through which this salt remains liquid while the temperature is rising, but solidifies and crystallizes if the temperature falls, and that too long before it falls to the original melting point.[c] Slow, quiet cooling favors, sudden cooling and agitation oppose the formation of large crystals. (TO BE CONTINUED.)

NOTE.—The publishers of the ENGINEERING AND MINING JOURNAL will thank the readers of this article if they will promptly call attention to any inaccuracies they may observe in it.

may occur on quenching from temperatures far below W and V, changes due in turn to slight variations in the crystallization, arrangement, or even composition of the component minerals of steel, to changes of stress or what not. But these trifling changes are comparable to those which occur in other metals under varying treatment, and not to the unparalleled change which occurs in steel when the quenching temperature rises to the critical point W, a change so vastly greater that it differs from them in kind. A theory which explains this change is not to be rejected because it explains these minor independent changes of hardness in a different way. To Mr. Metcalf's explanation of hardening, that it is due to tension, four fatal objections arise. (1) With gradually rising quenching temperature "tension" or stress should increase with some regularity: while the hardness produced suffers but a trifling increase till the quenching temperature reaches a certain critical point, when it leaps nearly to a maximum with extraordinary rapidity. (2) That quenching produces hardness when no tension exists, hardens both the interior and exterior, though setting up stress of opposite signs, throwing the exterior into compression, the interior into tension. (3) That stress should be more intense in large than in small pieces under like conditions of quenching, while large pieces are notoriously hardened less than soft ones. (4) That the stress should be the same for given quenching temperature, whether the steel has, just before quenching, been heated directly from the cold to that temperature, or has first been heated to a higher point and then gradually cooled to that temperature: whereas the hardness follows quite a different law. Steel quenched from V++, Figure 61, is not materially hardened if its temperature has just before been raised directly from the cold to that point: while if it has been heated slightly above W, cooled slowly to V++ and is then quenched, it becomes very hard. Experiments proving this will be described in § 257. In a word, the hardness produced by quenching is very far from being proportional to the stress.

[a] I have to thank Mr. Garrison for kindly examining with the microscope some fifty fractures of steel which had been treated with a view to testing the truth of his statement of Chernoff's.

[b] Private communication, March 28th

[c] Of course the melting and freezing points of a substance do not necessarily coincide.

PERSONAL.

It is with great regret that we have to announce the death of Mr. Robert J. Bogusch, who has been the highly efficient Superintendent of the Vallecillo Mining Company's Hacienda at Vallecillo, Nuevo Leon, Mexico, for the last three years. He was accidentally killed on September 27th, by falling down the shaft "San Vicente." Mr. Bogusch was only 35 years old and has left a widow and child. His loss will also be felt by a large circle of friends in Northern Mexico to whom his sterling qualities of character, his kindness of heart and genial disposition had endeared him, and who had learnt to appreciate the value of his friendship during the six years or more that he had passed in that section of the country. He enjoyed the fullest confidence of the company, and by his ability and conduct he had created relations between employers and employé of no ordinary character.

Mr. C. Laforgue, M.E., has gone to Mexico for the purpose of examining and looking into the affairs of the Boleo copper mines in Lower California.

Mr. Daniel W. Evans, superintendent of the Red Ash Colliery, at Wilkes-Barre, Pa., has been appointed superintendent of a colliery at Williamsburg.

The ninth annual meeting of the American Society of Mechanical Engineers will be held in Scranton, Pa., beginning October 15th and ending October 19th.

Mr. E. E. Olcott, mining engineer, of New York, who has been in Dutch Guiana since last June on professional business, is expected home on the 19th inst.

Mr. T. B. Barry has resigned from the General Executive Board of the Knights of Labor. This is the third resignation among the general officers of this association within a few months.

Mr. Patrick Kirwin has been appointed superintendent of the Best & Belcher and Gould & Curry mining companies, Nev., to fill the vacancy caused by the resignation of D. B. Lyman.

Mr. John Olin, until recently connected with the Caribou group in Colorado, has assumed charge of the Guadalupe Mining Company's mines at Villaldama, State of Nuevo Leon, Mexico.

A convention of miners, the Knights of Labor and the Federation of Miners and Mine Laborers, will be held at Columbus, Ohio, December 5th. It is said it will be one of the largest ever held in this country.

The American Federation of Labor will hold its third convention in St. Louis, December 11th. There are now represented in the Federation over 3000 local unions, with a membership of over 500,000 skilled workmen.

Mr. Olof Venström, Mining Engineer, who has been in New York demonstrating the Venström Magnetic Separator (having been familiar with its working in Sweden), to which we alluded in our issue of last week, has returned to Marquette, Mich.

Mr. Albert S. Bigelow, Treasurer of the Boston and Montana Consolidated, Tamarack and other mining companies, will make a tour of inspection of the various properties in which he is interested, leaving Boston October 20th, and returning late in November.

We are glad to learn that Mr. Arthur F. Wendt, Mining Engineer, has been making many friends in Bolivia, and that his work there is very much appreciated. On the 4th of July last, in compliment to him as a citizen of the United States, a dinner was given in his honor and a testimonial presentation took plac

Mr. E. G. Woodford has been appointed State engineer of mines by the Transvaal Government. This new office has a most important bearing upon the future of the mining industry of the Transvaal, and the establishment of a department which will have control of mining in that country is a proof that the authorities have at length become alive to the magnitude of the interests of the new state of affairs. Mr. Woodford has had extensive experience in the United States, Mexico, South America and other countries.

Dr. Samuel Kneeland, well known from his long connection with the Massachusetts Institute of Technology in Boston, died of heart disease in Hamburg, Germany, on September 27th. In August, 1866, he was appointed Secretary of the Institute and Professor of Zoölogy and Physiology in that institution. Of late years he had been engaged in lecturing and literary pursuits, chiefly in New York City. His favorite studies were volcanic and earthquake phenomena, to obtain a knowledge of which he visited most of the regions of the globe subject to them.

The American Institute of Electrical Engineers held its twenty-eighth meeting and the first for the present season on the 9th inst. at the House of the American Society of Civil Engineers in this city. The topic of discussion was a paper read at the last meeting by Frank J. Sprazue on "The Solution of the Municipal Rapid Transit Problem." Mr. Sprague was present and replied successfully to the criticism on the faults of the system, claiming that they were faults of construction and adminstration and not faults inherent in the system itself. The next meeting of the Institute will be on November 13th.

Professor Henry Carvill Lewis, to whose death we referred in our issue of July 28th, left the bulk of his fortune of $100,000 to his widow and daughter, with contingent bequests, in the event of their death, for the advancement of science. The will provides for a distribution of his scientific library and geological specimens, to various institutions of learning. His microscopical rock sections are left to his friend, Dr. George H. Williams, of the Johns Hopkins University, Baltimore, as also any mineralogical or lithological books that he may desire. Professor Lewis' unpublished scientific manuscripts are to be edited and published, and Dr. Williams is appointed editor of those relating to mineralogy and geology.

INDUSTRIAL NOTES.

Messrs. Miller, Metcalf & Parkin, Pittsburg, Pa., will add to their works a department for the manufacture of common steel.

The Mount Vernon Furnace, near Reading, Pa., belonging to Alfred B. Grubb, of Philadelphia has been sold to David B. Landis, of Lancaster, for $23,000.

The Thomson-Houston International Electric Lighting Company is sending out an incandescent lighting plant for a mining establishment in the Andes, 14,700 feet above sea level.

The Memphis & Charleston Railway Company, of Memphis, Tenn., has ordered work to start immediately on the company's machine shops in Sheffield, Ala. The cost will be about $300,000.

The suit of I. Townsend Burden against James A. Burden and the Burden Iron Company, which was being heard before Justice Parker, in the Circuit Court at Troy, N. Y., has been postponed till Nov. 15.

The Pecos Irrigation & Investment Company, lately organized to reclaim and develop agricultural lands by building canals, etc., on the Pecos River, Texas, is preparing to commence work. The capital stock is $600,000.

The Jefferson Iron Works, of Steubenville, Ohio, have decided to commence the erection of an additional blast furnace at an early date. It will probably measure 75 × 17 feet, and have a capacity of about 175 tons per day.

The meeting of the stockholders of the Sheffield Furnace Company, Ala., held on the 4th, was adjourned until Tuesday, the 16th inst. At that time it is expected that the question of leasing the furnace will be definitely decided.

L. S. Allison, an extensive ironmaster of Hazleton, Pa., has purchased the Minersville machine shops that have been totally idle for a number of years. Operations have been resumed. Joseph Gartley has been appointed superintendent.

The American Wire Nail Company, Covington, Ky., has increased their capital from $100,000 to $300,000, and will add a rod mill of 100 tons capacity and a wire mill of 75 tons capacity, double turn. The works are to be completed next February.

The old Huron Furnace, at Jackson, Ohio, which has been idle since 1884, has been generally repaired and has been put in operation under the management of a new organization known as the Jackson Iron Company. The furnace has a capacity of 30 tons per day.

Dr. J. M. Bailey whose land purchases in and near Bristol, Tenn., were mentioned in our correspondence last week, proposes to erect at Bristol, Tenn., two large furnaces with a capacity of 160 tons per day each for the manufacture of Bessemer steel and a large rolling mill.

The Webster, Camp & Lane Machine Company have issued Circular B, which contains may excellent plates illustrating their well-known wire-rope haulage machinery, both for "underground" and "above ground" haulage, and in which are described the "tail rope" and "endless rope" systems.

The Cleveland Silver Metal Company, Cleveland, Ohio, intends to offer at public sale its whole franchise, including factory, machinery, tools, etc. The company began business about one year ago, manufacturing a new white metal, which they termed "silver metal," in sheets and bars for the trade.

Messrs. Charles A. Schieren & Co., of this city, among many recent sales of their patent leather link belting, report sales to the Erie Car Works, Erie, Pa.; P. Lorillard & Co., Jersey City; Gautier Steel Department, Johnstown, Pa.; Copperfield Mining & Smelting Company, West Fairlee, Vt., and the Edison United Manufacturing Company of this city.

What is probably the tallest smoke chimney in the world is now being completed at East Newark, N. J. The base diameter is 28 feet. It is solid brick to an altitude of 310 feet. At its top it is 9 feet in diameter. A cast-iron rim on top makes the total height of the structure 335 feet. One million seven hundred thousand bricks were used in its construction, and it is said to have cost $85,000.

The Babcock & Wilcox Company, of New York, have made a great record in their sales of boilers for the month of September, aggregating 16,200 h. p., probably the largest horse-power of stationary boilers ever sold by one concern in a similar period; 1500 h. p. was for the Electric Light and Power Company of Melbourne, Australia, and 7500 for the Spreckels Sugar Refining Company, Philadelphia, Pa.

Messrs. Carnegie, Phipps & Co., of Pittsburg, Pa., have just completed one of the largest steel castings ever made in this country. It is intended for the 42-inch cylinder of the 3000 ton shears in the slabbing mill at Homestead, and weighs 24,600 pounds. The cast was entirely successful, and when taken out of the mold was free from any flaws or "bubbles" which formerly militated against the value of steel castings.

At a special meeting of the stockholders of the Fall River Iron Works Company, held at Fall River, Mass., on the 11th inst., it was voted to increase the number of shares from 960 to 4000, and its capital stock from $96,000 to $1,400,000. This is believed to be preparatory to the erection of a large mill upon the old iron works property, which is now owned by the American Printing Company.

to charge the Atkinson company $10 per ton more for steel than it charged to the members of the trust company. The trust company is further charged that when the Atkinson company made a bid for a contract for springs one of the members of the trust company was authorized to underbid at a price which would incur loss for account of the trust. By this means the Atkinson company was to be frozen out of business.

The erection of a pipe works for the West Superior Steel Company, at Duluth, Minn., has been completed. The works have a capacity for producing 200 tons of cast-iron pipe daily. The foundation has already been laid for a blast furnace to have a capacity of 200 tons per day, work on which has been suspended until spring next year. At that time will also be commenced the erection of a Bessemer steel plant, for which Mr. James P. Witherow, of Pittsburg, Pa., who has built the pipe works has also the contract.

The largest cotton press ever built in this country has just been sent from the Reading Iron Works, Reading, Pa., to Brunswick, Ga., and it is believed that it will revolutionize all the compress business in the South. It weighs 230 tons, standing on a base 12 by 24 feet, connecting with four links 38 feet long, and each weighing nine tons. One of the castings weighs twenty-five tons. Six months time was required to build it.

It is reported that a company has been organized in Washington with ample capital to manufacture railway cars constructed entirely of sheet steel, under the patents of C. W. M. Smith, of San Francisco. The company is said to be negotiating for the purchase of a large tract of land near Chicago, where the cars will be built. It is claimed for the new vehicles that they are absolutely indestructible and non-combustible, and that they can be built as cheaply as wooden coaches.

The case of the United States Gas Improvement Company, of Philadelphia, vs the Manchester Gas Light Company, is now on trial in the United States Circuit Court, at Concord, N. H. It is an action brought to recover $25,000 for alleged breach of contract, the plaintiffs claiming that they made a contract with the defendants to manufacture and put in a complete water-gas plant, and that such a plant has been made by them and is ready for delivery, but is refused by the defendants. The defendants deny that any such contract was made by them.

The Atkinson Car Spring Works made application for a membership in the trust and they make its allottment less than half its capacity. It would thus have to pay 15 per cent dues on the greater portion of its manufacture. The trust also insisted that prior to acceptance as a member the Atkinson company should exhibit to the secretary of the trust all of its contracts. This it refused to do, and the trust company made an arrangement with the American Steel Association under which the latter company required its members

The Park Brothers Company is a member of the American Steel Association, and is charged with having, under the above illegal arrangement, charged the Atkinson Spring Works $10 per ton more than it charged its members for a quantity of steel, taking notes in settlement. The whole trust arrangement is claimed to be illegal, void, in restraint of trade, and against public policy. The court is asked to enjoin the objectionable practices and to restrain the Park Brothers Company from collecting on the notes given it anything in excess of the market price for steel.

Work will shortly be commenced remodeling the old rail mill at the Edgar Thomson Steel Works, Braddock, Pa., to convert it into a department for the manufacture of steel billets and blooms of sizes ranging from 11 inch upwards. The old roughing rolls will be utilized, but new and improved finishing rolls will also be introduced, which are an invention of General Manager W. R. Jones, and are much more rapid in movement than the old style rolls. The old rail mill has been idle since the operation of the present mill with a capacity of 1500 tons per day was begun. The new blooming mill will be completed about the middle of December.

James R. Hosmer, Consul-General of the United States to Guatemala, in a report to the Department of State, says there are favorable inducements for the establishment of factories for glass, wagons, agricultural implements and many other articles of general use which are now imported and command exorbitant prices. Common laborers receive from 37½ to 75 cents per day, and railroad laborers $1. American carpenters and painters are paid $4.50 to $5 a day, and machinists $5 to $6. American merchants in Guatemala, Mr. Hosmer says, assert that they are compelled to purchase their wares in Europe because the goods sent from America are so carelessly packed as to be badly damaged in transit. American-made prints, agricultural implements and cutlery are preferred to those of other countries, and this has led dealers in Germany to imitate American trade marks

and endeavor thereby to sell their wares as of American make.

A bill was filed in the United States Circuit Court at Chicago, Ill., on the 10th inst., by the Atkinson Car Spring Works Company against the American Railway Spring Company, the American Steel Association and Park Brothers Company, asking for an injunction to restrain a trust from making unjust discrimination so as to ruin the complainants' business. In 1887 the American Railway Spring-makers' Association was formed for the purpose of regulating the prices of springs and for the protection of manufacturers. Of this association the Atkinson Car Spring Works was a member. In March, 1888, the same association organized a trust called the American Railway Spring Company, upon a stock basis, and issued certificates to its members on payment of $250. Allotments were made of work to be done by every member, and out of the sales they were to pay 2 per cent to the trust for distribution. If the amount manufactured exceeded the amount allotted, then the member so exceeding was to pay 15 per cent on its sales.

CONTRACTING NOTES.

Our list of machinery and supplies wanted will be found on page xiv. Manufacturers of machinery, engineers and contractors should consult our directory of "Contracts Open" on page xiv. This week, proposals are invited for the following new contracts: No. 1111, Sewer Construction; No. 1112, River Improvement; No. 1113, Extension of Breakwater; No. 1114, Construction of Breakwater; No. 1115, Furnishing Cement, Sand, Pebbles and Stone; No. 1116, Artesian Well Sinking; No. 1117, Dredging; No. 1118, Dredging; No. 1119. Dredging; No. 1120, Dredging; No. 1121, Water-Works; No. 1122, Water-Works; No. 1123, Rock Excavation and Dredging; Nos. 1124 and 1125, Dredging.

Mr. Walston H. Brown has been appointed receiver of the firm of Brown, Howard & Co., aqueduct contractors.

Contracts for grading and trestle work for branch road for the Cartersville Steel and Furnace Company, Georgia, have been let to Eugenius A. Nisbet. The company has about closed contract for 1,500,000 bricks for building its furnaces.

The bids received this week by the Navy Department for an electric lighting plant for the U. S. steamer Pensacola showed that the lowest bid was that of the Edison Company at $6000, and the highest that of the Brush Company, at $12,287.

GENERAL MINING NEWS.

Shipments of iron ore from the mines of the districts mentioned below for the season up to and including October 3d, as reported by the Marquette *Mining Journal*, were as follows:

		Tons. 1888.	Tons. 1887.
Marquette,	Marquette District	639,451	674,019
St. Ignace,	" "	91,051	77,065
Escanaba,	" "	642,655	721,953
"	Menominee District	833,088	956,871
"	Gogebic District	139,643	.....
Ashland,	" "	863,742	904,934
Two Harbors,	Vermillion District	299,671	312,195
Total tons		3,572,301	3,627,036

Mr. John W. Young, of Salt Lake City, is busily engaged in building a railroad between Salt Lake City and Park City. Five hundred graders are now at work on the road. The Union Pacific has a branch line to Park City, and now hauls all the ore from there. It is the prevailing impression among railroad men that the Union Pacific will crowd Young's road to the wall.

STANDARD OIL COMPANY.—The Bloomfield Oil Company, of Jackson, Mich., and the Ingalls Oil Company, of Detroit, have been sold to the Standard Oil Company.

ALABAMA.

ANNA HOWE GOLD MINING COMPANY.—This company has been organized, with a capital stock of $500,000, by R. S. Minor, Lewis S. Frierson and R. Knauff to mine for gold and other precious minerals.

BIBB COUNTY.

CAHABA COAL MINING COMPANY.—This company has contracted to mine 300 tons of coal daily for the Southern Pacific Railroad Company.

ARIZONA.

COCHISE COUNTY.

WATERVALE MINING COMPANY.—The double compartment shaft now being sunk on the Bunker Hill is down 335 feet. Three shifts are running. Arrangements are making for the erection of new hoisting works. The Rattlesnake, Mammoth, Bunker Hill and other properties of the company are being rapidly developed.

PIMA COUNTY.

PEERLESS MINING COMPANY.—The starting of the Peerless mill has been somewhat delayed by the repairs which were necessary, but it is expected that it will be in full operation by the middle of this month.

CALIFORNIA.

Two opinions, directly antagonistic, says the Sacramento *Bee*, have been filed in the local United States Land Office by Register Hetzel and Receiver Linthicum in the case of the Central Pacific Railroad, applicant, against L. D. Valentine, mineral contestant, and any mineral claimants. The case involves the region from Rocklin to the Nevada State line in its final adjudication.

In the territory to be affected are the mines about Forest Hill, the famous Idaho, the mines in the Grass Valley District, and all mineral land supposed to have been excepted from the operation of the mineral clauses of the Acts of 1862 and 1864.

The direct issue was raised as to the title of the Rising Sun mine near Colfax. S. D. Valentine is a member of the firm of Francis & Valentine, printers, in San Francisco. In 1866 he located the Big Oak Flat mine, adjoining the Rising Sun. He built works and took out $50,000 worth of ore, when the New York capitalists who owned the Rising Sun claimed title to the land, into which it was believed their ledge extended. They at once purchased the railroad title, and claimed the property as agricultural land upon the ground that the grant was of date with the passage of the Acts of 1862. If this claim is good then all mineral lands developed subsequent to that act are vested in the railroad company, or to whomsoever the corporation may have passed title. Receiver Linthicum claims that mineral lands were exempted from the operations of the Act of 1862, granting the land to the railway company, and concludes that the land in dispute is mineral in its character. Linthicum claims that this fact is established by the construction placed upon the act by the corporation itself.

Register Hetzel maintains that all efforts to establish the mineral character of the land disputed or to attach any value to it have failed. He also holds that the title to the land rests in the corporation. That at the time said title vested none of the lands in the section were within any exceptions from the grant by reason of any status as mineral lands; that the subsequent discovery of minerals in paying quantities on that part of lot 3 of said southeast quarter occupied by Big Oak Tree mine does not effect the rights of said railroad company or its grantees. That the Central Pacific Railroad Company is entitled to patent for all the tracts the subject of this hearing.

The case will have to go to the General Land Office at Washington for settlement.

AMADOR COUNTY.

CHICAGO MINE AND MILLING COMPANY.—Nothing especially new about here. The company ordered all work stopped on its property August 1st last, and the opinion is that nothing more will be done, unless there is a reorganization of the company. We are advised that there has been a great deal of trouble among the members of the company from the start.

COSMOPOLITAN.—We are advised by a correspondent that since June much better ore has been found, with strong indications it extends into the claim joining them on the north. The owners have secured that claim for $25,000, and feel quite confident they have a good property now. Parties interested in the company are expected to visit the mines this fall.

MONO COUNTY.

BULWER CONSOLIDATED MINING COMPANY.—The suit of this company against the Standard Con. to settle title to the disputed ownership of an ore development made on the upper levels began in Bodie on the 2d inst.

SANTA CLARA COUNTY.

QUICKSILVER MINING COMPANY.—A meeting of the board of directors was held on the 10th inst. Official advices show that the production of the mine for September amounted to 1178 tons; during the month the sales aggregated 2137 tons.

The financial statement October 1st is as follows:

Cash deposited in Mechanics' Bank	$4,962.71
" " Bank of California	55,040.00
Quicksilver on hand, valued at	136,206 00
	$196,218.71

The unpaid pay rolls amount to $10,300.

COLORADO.

We have received the following statement, which shows the gold and silver bullion deposited at the mint of the United States at Denver during September, 1888:

	Gold.	Silver.	Total.
Colorado	$114,454 69	$1,138.22	$115,592.91
Arizona	3,108.46	31.57	3,140.03
Idaho	543.68	1.32	545.00
New Mexico	7,950.62	70.13	8,020.75
Wyoming	251.27	1.18	252.45
Jewelry	415.60	4.36	419.96
Re-deposits	1,083.30	46.83	1,130.13
U. S. Coin	280.00	.....	280.00
Total	$128,087.62	$1,293 61	$129,381.23

Gross weight deposits for September, 8169·07 ounces; net weight deposits for September, 7855·11 ounces; net weight, base removed, 313·96 ounces; average per cent, base removed, ·038; average fineness gold, ·785; average fineness silver, ·181.

COLORADO COAL AND IRON COMPANY.—It is stated that this company will show net earnings for the year made almost exclusively from coal and coke, of between $350,000 and $400,000. There is no truth in the report that the company has shut down its mills. The iron and steel trade has been very dull; should it continue stagnant the mills may be closed, but if present indications of an improvement are realized the mills will be kept running as usual.

CLEAR CREEK COUNTY.

COLORADO CENTRAL CONSOLIDATED MINING COMPANY.—In the case of this company vs. John Turck in the United States Circuit Court, William Arnold was appointed inspector of mining property in the place of George W. Cox. In the counter-complaint of John Turck vs. the Colorado Central Consolidated Mining Company, an injunction was asked restraining the company from working property claimed by Turck, which was denied by the court. The defendant, however, was ordered to render monthly statements of the amount and value of ore taken out, the first report to be given November 1st. It was also ordered that the complainant had the right to inspect part of the defendant's workings two days in each week.

GILPIN COUNTY.

The narrow gauge road at Central City, built by Mr. B. H. Locke, is said to be a great success, so far as handling ore is concerned, and that it will in time yield handsome profits to its owners. The saving to the California alone is estimated at $300 to $400 per month.

ENTEPRISE MINING AND MILLING COMPANY.—The company, whose base of operations are near Gold Dirt, Independent District, has resumed work on its properties. A contract has been let for driving the tunnel an additional 50 feet. It is anticipated that in driving this distance a good body of pay-ore will be struck.

GREGORY BOBTAIL MINING COMPANY.—We are advised that this company, whose mines are situated at Central City, is putting out $50,000 per month, which just about pays expenses; that the mine is now able to keep the 125 stamps running, and that there is a prospect of profit.

IVANHOE MINING COMPANY.—This company, Nevada district, has commenced shipping ore. The superintendent reports that sufficient ground has been opened to ship every week three cars—thirty tons—of smelting ore to the valley smelters. This is outside of the stamp mill dirt that will be shipped.

LAKE COUNTY.

ADAMS MINING COMPANY.—The company is maintaining an output at present of 100 tons of smelting ore a day, and from 10 to 15 tons of concentrates from the mill, which is the largest regular product in the history of the mine. The ore is coming from both the Discovery and Brookland shafts, and, it is stated, is undoubtedly the same chute from which the Maid-Henriett and Wolftone have secured their large ore product.

CASTLE VIEW MINING COMPANY.—This mine, on Carbonate Hill, has been leased to Capt. Eben Smith, manager of the Henriett & Maid and Louisville mining companies. To open and drain the property a long drift is being driven from the Henriett & Maid workings through the Big Chief to the Castle View. The breast of the drift is now in Big Chief territory, and will have to be driven 175 feet further in order to connect with the Castle View shaft. By this drift the water in the Big Chief and Castle View mines will be drained to the main shaft of the Henriett & Maid, the large pumps of which can easily handle the water made in all three mines, as well as the Morning Star. When drained, the Castle View will be worked through its own shaft. This is one of the most important enterprises in progress in Leadville at the present time, as it will make two more producing mines. The drift which is being driven from the Henriett & Maid has run so far in ore, and at present shows 4 feet of ore of excellent grade in the breast. The Big Chief has drifted to the Castle View line and has opened a large body of ore from 2 to 8 feet thick along the line. The ore is of excellent grade. The Castle View, when last worked last winter, had a good body of ore, which was in places 14 feet thick.

LEADVILLE CONSOLIDATED MINING COMPANY.—A Western paper has published a report concerning the condition of the mines, which, as corrected in several important details by Mr. C. A. Cameron, the Secretary of the company, reads as follows: The President has ordered that work at the mine should be suspended, October 1st. When the prospecting operations in that place were commenced last winter, the company had some $60,000 in the treasury. This money is now exhausted and the company is $4000 in debt. Steps must be taken to raise more in order to continue the work. In the raise from the lower level, which was made to prospect the second contact, low grade iron ore was struck, and as work was done in it some of better grade was opened. The latter assayed as high as 15@25 per cent excess in iron and manganese. This distance from the lower level to the contact was about 125 feet. As the water level is some 15 feet lower the pumps have been raised, and when more work is to be done a new level will be driven from the shaft. In this way a cost of pumping water, amounting to $1200 per month, will be saved. In our last issue we referred fully to the financial condition of this company.

PITKIN COUNTY.

Mr. J. B. Wheeler has purchased Mr. Hewitt's interest in the sampler known as the Hewitt sampler, and placed Mr. Herbert Harding in temporary charge.

ABINGDON.—A strike in this mine, on Aspen Mountain, is reported. A three-foot vein of 400-ounce ore was struck. Experts pronounce it to be a fissure vein between well defined walls, increasing its size as the work is prosecuted. The Abingdon claim is located just below the Bonnybel, and is managed by Major Kasson. The mine is about to commence shipping, and the working force will shortly b increased, when room can be made for the men.

ASPEN MINING AND SMELTING COMPANY.—The company makes its regular shipments, and is now free from debt, having paid off during the past eight months half a million of indebtedness.

MOLLIE GIBSON.—H. B. Gillespie and B. E. Shear have ordered of Frazer & Chalmers a ten-stamp mill, with Gilpin County tables and Frue vanners for this mine. If this trial mill proves a success they will enlarge the mill to 100 stamps, as there is a vast amount of low grade milling and concentrating ore in the mines around Aspen that will not pay to ship to smelters.

IDAHO.

[We have received from Mr. Geo. F. Barlow, 140 Nassau street, New York City, the following answer to a correspondence published in the ENGINEERING AND MINING JOURNAL. While we are not in posses-

sion of all the facts, we must say that the data we have goes far towards justifying our correspondent's statements. Moreover, Mr. Barlow appears to be wholly unacquainted with the use of quotation marks, and credits to our correspondent's informant the whole instead of a small part of the letter he criticises.—Ed. E. & M. J.]

"In your issue of the 15th of September, under 'General Mining News,' you quote, referring to certain mining properties in Idaho, what your correspondent 'received in part from a reliable correspondent.'

"Starting with the premises, any fair-minded reader would be inclined to discredit the information. Being one of several New York parties who have endeavored to induce Eastern capital to invest in legitimate channels in the Territory of Idaho, I have taken occasion to look into the matters in detail to which your correspondent's correspondent refers.

"Taking them *seriatim*, my information is from headquarters and not from hearsay, I find as follows:

"Alturas Gold, situated at Rocky Bar, is an English company which has made large outputs of ore within the last two years. Recently, however, owing to a change in management and the fact that more development work was necessary, the output fell off. In refutation of your correspondent's statements, I learn that the mine is continually improving, that at no time has the body of ore in sight been so large as it is to day, that the mines have always paid their just debts. As to the present condition I am also in receipt of the last cable from the superintendent to the London office, dated October 1st: 'Fourth week, final clean up, produced 250 oz. of bar gold; for the week, mined 390 tons of ore. For the week, milled 450 tons of ore. For the month, produced 831 oz. of bar gold. For the month, mined 1290 tons of ore. For the month, milled 1265 tons of ore. Expenses, $8000.' The profit accruing was between $6000 and $7000.

"*Wide West Rocky Bar.*—An English company, of which but 15,000 out of 120,000 shares have been put on the market; $125,000 has been spent in plant and development work. The company have a 20-stamp mill and hoisting works complete, and at present are running 15 stamps. This would seem to explode any theory of fraud. Much of the money already expended was private capital put in before the property was sold. 'The gentleman from London' was specially sent over by the company to examine the property. He did examine it, and reported most favorably.

"*Silver City Oro Fino.*—This can almost be disposed of by your correspondent's words: 'I know nothing of this section of the country.' If he will inform himself he will find that the Oro Fino is a private company which has expended over $100,000 in development and plant; that they have a 30-stamp mill and hoisting works complete, and that they are running 30 stamps on *Oro Fino ore*, and from present indications expect to pay large returns by the 1st of January.

"*Mat Graham's* property will not suffer from the description given by your correspondent. He says $300,000 has been spent with this result, a mill, 'finest in Idaho,' '20-stamp dry crushing,' 'a large sum of money spent in making roads,' 'a magnificent mill site,' and 'timber and water in abundance,' '200 men working.' Graham has overcome what has seemed insuperable difficulties, the result of lack of facilities for transporting and the short season for favorable work. Graham never maintained that his ore was of a high grade, but the fact that he is employing 200 men is sufficient proof that he intends to make up in quantity what he lacks in quality.

"The whole purport of your correspondent's article seems to be a personal attack on a man who has brought his own private capital into the country and after developing a property endeavored to sell it to English capitalists. The benefit to the country is apparent to any one who has ever been there. Rocky Bar bids fair to be the foremost mining town in Idaho, and mainly through this man's exertion. Only a fortnight ago, a company was organized to construct a telephone and telegraph line between Mountain Home and Rocky Bar. Newcomb C. Barney, of New York, is one of the stockholders and directors. This gentlemen, together with others in New York, has large interests at Rocky Bar, and they are all confident of the merits of their enterprises.

"'The Mountain Goat,' one of their properties, is said to be the richest at the Bar, the ore averaging one hundred ($100) dollars gold to the ton.

"All these properties are open to the inspection of the public, and as one of the well-wishers of the Territory I would like the independent inspection and criticism of some one other than your correspondent's correspondent, who, as near as I can learn, is a postmaster at Atlanta named Brown, who tried to levy blackmail on the 'Expert from London' and 'the man that floated the mine.' The result was hardly beneficial. He, the postmaster, was 'stood up;' they, the Expert and the man, indignantly repulsed his offers and defied his threats. This may explain the animus of the whole article and show the difference resulting from 'stood in' and 'stood up.' Another result seems to have been an attempt on the postmaster's part to reflect discredit not only upon the enterprises of that particular party but upon all of us who are interested in that section of the country.

"Reference to the Boise *Statesman* and the *Mountain Home Bulletin* will give fair-minded people an idea of the honesty of the efforts of all parties in the development of '*a territory that holds wonderful mines, which have been handicapped for want of transportation facilities.*'"

MICHIGAN.

COPPER MINES.

Atlantic Mining Company.—The mine at present hoisting rock from all four of its shafts and sending about one thousand tons to the mill daily. Some new machinery recently has been added. It is intended to erect a hoisting plant at No. 4 shaft next summer, when each shaft will have its own hoisting appliances. No. 1 shaft is down 500 feet; No. 2, 1000 feet; No. 3, 1000 feet, and No. 4, 1700 feet. The policy of the management is to sink but one shaft at a time, and No. 4 is now sinking.

Franklin Mining Company.—Advices dated the 4th inst. state that the mine is improving at the east lode, thirtieth level, both in appearance and value as the drifts advance each side of the cross cut. The lode in the south drift and stope is more productive for the last ten or fifteen feet than ever before. As there has been some talk to the effect that the Franklin is seeking a consolidation with the Pewabic, in order to obtain the latter's ground for the extension of its levels, the Boston *Transcript* is authorized to say that the Franklin has not taken the slightest step in any direction toward such consolidation, believing it to be more to the Pewabic's advantage than its own. The Franklin has ample ground for many years work; indeed, the new find at the east lode really makes a double mine of it.

Tamarack Mining Company.—A tract of about 38,000 acres of hardwood and timber land, lying northeast of Torch Lake, in Houghton and Keweenaw counties, has been sold to this company. The land is located in townships 55, 56 and 57, ranges 31 and 32. The purchase price was $3.75 per acre, or a total of about $142,500. The tract is said to be quite valuable. It contains about 20,000,000 feet of pine, spruce and hemlock, over 1,000,000 cords of hardwood, and would afford enormous quantities of cedar posts, telegraph poles and ties. The Tamarack and the three adjacent mines controlled by its management can get annually from this land for ten years from 75,000 to 100,000 cords of wood and all the mining timber that they may need. By means of the new saw-mill at Dollar Bay, the timber can be utilized to the best advantage. The soil of the land purchased is excellent for agricultural purposes. The intention is to sell it to farmers as it is cleared. Eventually, the company will probably receive from sales of cleared land, as much as the total cost price of the tract. A letter from this mine says that the cross-cut toward the lode at the south level of No. 2 shaft was drifted 35 feet, and has pierced the lode. It shows considerable epidote—a favorable feature—and some quite strong copper. Ground seems to be harder than usual, so that it is necessary to get well into the lode before it can be judged fairly. The stopes are looking favorable, and at the fifth level a width of 8 feet is found. The third level south of No. 2 shaft shows a rich stope over 10 feet wide. North of No. 1 shaft, second level, the stope has improved very much. This was started only 10 feet long, but good rock is being found for 40 feet. It is intended to start a drill to run south of No. 1 shaft, sixth level, to explore ground between the present workings and the Wolverine mine. There are on the surface at No. 2 shaft about 1000 tons of stamp rock. The surface arrangements for winter are nearly completed.

Tamarack Junior Mining Company.—The No. 1 shaft has been sunk 283 feet, a gain of 59 feet during September, and the No. 2 shaft was sunk 47 feet during the month, and is now down 156 feet. The ground is reported favorable for progress.

IRON MINES.

Cleveland Iron Mining Company.—The directors of this company have called a special meeting, at which the advisability of bonding the mines of the company for $400,000 will be considered. There is little doubt that it will be done, as the money so raised will be used in building a fleet of powerful steamers, with barges for consorts, and this fleet will carry the ore from the company's mines, from the docks at Escanaba and Marquette, to Cleveland and other Lake Erie ports. There is no question that this will be a money-making operation for the company. Owners of lake vessels have made great profits for the past two years, and the Cleveland company can effect a saving of nearly 50 per cent on the present cost of placing its ore at Cleveland.

Norrie.—From what it has done already this season, it can be safely set down that this mine will achieve a larger output this year than any other mine in the Lake Superior country has reached thus far in a single season. It had sent to market by water up to the 3d inst., a total of 307,917 tons of ore, in addition to quite an amount sent to furnaces by rail since the first of the year. The mine can be safely put down for better than an output of 400,000 tons this year.

MONTANA.

SILVER BOW COUNTY.

Boston & Montana Consolidated Copper and Silver Mining Company.—This company has made the first payment of $50,000 on the Pennsylvania mine which was bonded by the company some time ago for $100,000. The mine is now under active development.

Butte & Boston Mining Company.—Mr. William Owsley has sold his hay ranch, which is located just across the railroad track at the South Butte depot, to this company for $10,000. It is understood that the company intends putting up a large smelter and reduction works at this place.

Lexington Mining Company.—Official advices to us show that the production for September amounted to $13,253.60 in gold, $61,547.35 in silver, a total for the month of $94,253.60, and $615,719.79 for the nine months of 1888.

NEVADA.

ELKO COUNTY.

Nevada Queen Mining Company.—There has been some very high grade ore extracted just north of the line of the 450-foot level. The 350-foot level stopes have yielded a full supply for the mill. The battery assay, the week ended the 5th inst., has been $196 per ton. Average assay from car sample of 280 car loads of concentrating ore hoisted, $21.30 per ton. Twelve bars buillion were shipped; assay value, $25,022.

EUREKA COUNTY.

Eureka Consolidated Mining Company.—We are informed that the profits for the month of September will amount to about $8000. It is estimated, also, that there are nearly 20,000 tons of speiss in the dump, which, at the present rate of working, will last for two years longer. There seems to be a possibility of the supply of coke for the smelting works giving out.

STOREY COUNTY—COMSTOCK LODE.

We condense the following from the Virginia City *Chronicle*:

The pay-rolls for September of the different Comstock mining companies amounted to $191,096. The above is merely the sum disbursed in wages to employés and does not include other operating expenses.

Several months ago an agent of a New York company had visited the Comstock for the purpose of estimating the cost of transmitting to the lode by electricity the water power of the Truckee River, for operating stamp mills to be erected for the purpose of crushing low grade ore assaying less than $5 per ton. This the agent claimed could be done and leave a fair profit margin in bullion above the cost of production. Under date of September 26th, this agent writes the *Chronicle* that he has succeeded in getting nearly sufficient capital subscribed to carry out the project and that he will shortly visit the Comstock again to ascertain what amount of ore of the grade mentioned can be secured. While here this agent ventured the opinion that he could sort enough ore out of waste dumps at the mines to keep a 60 stamp mill in steady operation crushing it, but he evidently overlooked the fact that to obtain a ton of ore it is often necessary to remove a miniature mountain of waste material.

Consolidated California & Virginia Mining Company.—The bullion shipments on September account, so far, amount to $134,081.61, with the final clean up for that month yet to arrive.

Sierra Nevada Mining Company.—Miners are taking out ore from the old gravel pit on the Sierra Nevada ground. The ore is not high grade, averaging less than $12 per ton in gold, and they can just about make regular wages. The ore secured is not rock in place, but loose quartz left from hydraulic washings. To secure a ton of it involves the handling of many tons of waste material.

A string of sluices for placer mining is being placed in Sixmile Canyon Creek, near the Bossell mill, below Flowery. Some coarse gold was recently panned out from the bed of the creek at the point where the sluicing will begin. The gold found is coated with quicksilver, which escaped from amalgamating pans in the form of tailings. Placer gold has been found at many points along the course of Sixmile Canyon Creek, but heretofore not in sufficient quantities to pay.

The electrical plant at the Nevada mill, it is reported, will be in readiness for a test run by the 15th inst.

The flow of water in the Carson River is reported to have increased materially in volume, and it is anticipated that before the close of the present month at least one half the stamps in mills operated by that stream will be dropping on ore from the lode.

Baltimore Mining Company.—The ore extracted in explorations on the 338 level of this mine is to be crushed at the company's ten stamp mill. The ore is officially stated to show an average assay value of above $100 per ton while selected samples show a value of $500.

Hale & Norcross Mining Company.—This company will resume daily ore shipments of 200 tons whenever crushing power is available.

PENNSYLVANIA.

Germania Coal Works.—The works at Fayette City have been purchased by Joseph Turnbull, who has begun cleaning out the mine preparatory to working it.

COAL

Philadelphia & Reading Coal and Iron Company.—Provision has just been made by this company for retiring the $110,000 of divisional coal land bonds maturing November 1st. They will be paid up on presentation, and the mortgage cancelled. The money is taken from the sinking fund of ten cents per ton established at the beginning of the year, which now amounts to $386,000. The property released embraces 1068 acres, and is known as the Raudenbush *et al* tract. It was bought by Mr. Gowen five years ago for $165,829, of which part was paid in cash, and $110,000 of six per cent bonds issued for the balance. During the receivership the interest on these bond was bought at four per cent. These bonds have the peculiar quality of being the only ones issued by the Coal and Iron Company that do not bear the indorsement of the railroad company. A contract was awarded to A. H. Church, of Ashland, by this company, to strip the mammoth vein, near Shenandoah. It will require one year to complete the task. Two million tons of coal will be secured from it, and the cost, it is said, will be only about one-third that of mining by the common method.

The wages of the railroad coal miners in Pennsylvania will be advanced 5 cents per ton on November 1st, increasing the mining rate to 79 cents a ton, according to the agreement made last April. It was then decided by the operators and miners in joint session that the mining rate should be 74 cents from May 1st to November 1st, and from the latter date to May next 79 cents. Some of the operators who were not represented at the joint convention, it is stated, will not pay the advance, and unless an amicable arrange-

ment is made before November 1st, it is probable that trouble will ensue, as the miners say they will enforce the advance

NATURAL GAS.

Judge Collier, at Pittsburg, on the 8th inst., handed down an opinion of vital interest to natural gas consumers, and one which will deprive the city of thousands of dollars of anticipated revenue. The city of Pittsburg assessed as real estate all the natural gas mains within the city limits, of which there are several millions dollars worth, and the natural gas companies failing to pay the tax, placed it in the hands of the delinquent tax collector, who was about to resort to legal measures to compel the Philadelphia Company to pay up, when the latter went into court with a bill in equity asking that the city be restrained from attempting to collect this tax. Judge Collier grants a perpetual injunction upon the city for this purpose in the following opinion: "The able argument of the learned counsel for the city has failed to satisfy us that the city of Pittsburg has the power to tax the plaintiffs' iron pipes. They certainly are not real estate situate within the city. The gas wells, to which they are claimed to be appurtenant, are located outside of the city in another county, and though it may be possible that the pipes represent part of the capital stock of the plaintiff company, the bill and answer discloses no taxation of the capital stock as such. The prayer for an injunction is granted. Let a form of decree be drawn up and submitted to counsel."

BRIDGEWATER GAS COMPANY.—An oil strike of more than usual interest and importance has just been made by this company. It is situated one and a half miles back of New Cumberland at Anderson's Landing, on the Ohio River, in West Virginia, and just opposite Toronto, in Ohio. The strike was an unexpected one, and it will open up an entirely new field. It is supposed to be the continuation of the Shannopin field, and a line drawn from the well, by way of Baden, in Beaver County, Pa., will strike the Bakerstown field. The company controls a tract about three miles long and one and a half miles wide in the vicinity of the well, and have made arrangements to obtain about 2000 acres more. The holdings of territory of the company were taken about a year and a half ago, but nothing was done till some time in August, when a contract was made to drill this well for gas.

PHILADELPHIA NATURAL GAS COMPANY.—The company has decided to call a meeting of its stockholders to act on a proposition to issue $2,500,000 of bonds.

Mr. John R. McGinley, secretary of the company, states that the resolutions passed by the Board of Directors in reference to this issue read as follows:

"*Resolved*, That the Board of Directors of the Philadelphia Company, having in view the increased demand for natural gas for the supply of manufactories and dwellings, and as a consequence the desirable extension of this company's plant, does hereby recommend to the stockholders, the issue of bonds to the extent of $2,500,000, such bonds to be secured by a mortgage upon the plant and other property of the company, and to be issued from time to time, as required, at the discretion of the board.

"*Resolved*, That a meeting of the stockholders be called to hold an election upon the question of such issue of bonds, at the office of the company, No. 820 Penn avenue, Pittsburg, Pa., at ten o'clock A M., on Wednesday, the 5th day of December next.

"These bonds will probably run ten years, will be redeemable in five years, and may bear five per cent, or six if the stockholders think that rate is best. The purpose of the company is to take care of its floating debt, and to provide money to carry out the extensions and changes in the plant of the company. It is intended to put the bondholders in the place of the creditors who hold the floating debt, and to save a large part of the current interest account. The issue of bonds will reduce the interest account, because it costs less to carry that kind of debt than notes in banks. To take care of this bonded debt the company will put aside in cash each year the money which it earns in excess of dividends, and which would otherwise be used to pay the floating debt. At the present time the floating debt is a little over $1,300,000, but with $200,000, which it has been agreed to spend, it is in round figures $1,500,000. The gross earnings are at the rate of $2,880,000, of which of course a portion—less expenses for wells and new lines—goes to the Chartiers Company."

It was rumored in Pittsburg this week that certain stockholders of the company who have paid money for their stock have taken legal advice looking toward filing a stockholders' bill against the board of directors, officers and management of the company to restrain the proposed issue of bonds and the making of a mortgage on the property, plant and franchises of the company. It is asserted that the proposed bill will be directed against the holders of stock, which it is claimed was originally improperly issued, without a valid consideration, to prevent the voting of said stock and have the same cancelled and the holders thereof account for three years of dividend.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to October 6th:

	1888. Gallons	1887. Gallons.
From Boston	3,383,298	3,298,817
Philadelphia	102,791,515	125,797,735
Baltimore	5,641,387	6,496,152
Perth Amboy	17,182,445	12,909,493
New York	272,656,369	288,160,742
Total exports	401,655,014	436,682,939

UTAH.

The bullion receipts at Salt Lake City, exclusive of ore, for the nine months of 1888 amounted to $2,641,920.55.

SUPERIOR.—A contract has been let to extend the tunnel of this group of mines at Alta 300 feet farther. It is now in 1000 feet.

SUMMIT COUNTY.

DALY MINING COMPANY.—The production for September was 87,954.69 fine ounces of bullion and $10,800.22 from ore sales, a total yield, approximately, of $98,754.63.

ONTARIO SILVER MINING COMPANY.—The production for September was of bullion, 75,110.42 fine ounces and from ore sales $99,265.12, a total, approximately, of $174,375.54.

FOREIGN MINING NEWS.

AUSTRALIA.

NEW SOUTH WALES.

BROKEN HILL PROPRIETARY COMPANY, LIMITED.—During the week ended August 16th the mines of this company, situated in the Barrier Ranges Silver Field, turned out the largest amount of ore and silver therefrom ever produced Six furnaces were employed less one new smelter for twenty-four hours, and the run was as follows: Ore treated, 2022 tons; bullion, 349 tons; silver, 92,553 ounces. The Broken Hill *Times* says: It will be pleasing to note that the record has again been broken, this time by nearly 2000 ounces.

CANADA.

NORTHWEST TERRITORY.

It is understood that a joint stock company of English capitalists has been organized to develop the coal mines, at Banff. The company is a strong one and the operations at the mines will be greatly increased.

PROVINCE OF NOVA SCOTIA.

The complete returns for this province show that during August 2237 tons of gold quartz were crushed, producing 1077 ounces of gold, valued at $20 per ounce. Much of the quartz yielded over an ounce to to the ton. The Island Gold Mining Company's mill of the Stormont district gave 294½ ounces from 252 tons; the mill of the Oxford Gold Mining Company of the Lake Catcha district, 200⅛ ounces from 173 tons; the Lake Lode Company's mill of the Cariboo district, 102 ounces from 99 tons, etc. The yield in some other instances was as low as one ounce to six tons.

DUNFERIN MINING COMPANY.—The gold returns from the mill of this company for the month of September were 224 ounces of gold from 850 tons quartz crushed.

MOLEGA MINING COMPANY.—The last clean-up of ten days' crushing has been completed, resulting in a brick of 250 ounces, worth $5000. The result of the first clean-up after 23¾ days' crushing was 450 ounces, the yield of 350 tons of ore.

WITHROW.—Forty-five tons of quartz crushed on this property yielded 93¾ ounces of gold.

PROVINCE OF ONTARIO.

LITTLE WHITEFISH RIVER SILVER MINE.—This mine has recently been purchased by Capt. Hermann Linde, who is now energetically completing arrangements for steady development. It is stocked in Milwaukee, Wis., for $300,000. The vein is a strong one, rich in argentiferous blendes and galena, and near the surface carries over 30 ounces of silver to the ton. The location is numbered by the government records "R 162" and contains 95 acres. The Little Whitefish traverses the location diagonally. Its water-power is splendid and timber ample.

MEXICO.

The following table, taken from the El Paso *Bullion*, shows the amount and value of the imports passing through the El Paso Custom House for the week ending the 2d inst.:

SILVER ORE.	Tons.	Value
C. K. C. S. & R. Co	1,116	$49,577
R. G. S. & R. Co	506	21.867
Don Enrique M. Co	58	9,078
	1,680	$80,522

METALS.	
Mexican silver coin, Wells, Fargo & Co	169,367
" gold " " "	17.595
Silver bullion, " "	5.891
Total	$273,375

It is rumored that the Troutt smelter, located at Chihuahua, will blow in this month. They have plenty of ore and a large supply of fuel.

SMELTING COMPANY OF MEXICO, LIMITED.—It is reported that the smelter owned by this company at Chihuahua has closed down for good. In our issue of June 4th, 1887, we referred to the organization of this company.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Oct. 12.

Statistics.

Production Anthracite Coal for week ended October 6th and year from January 1st:

	1888. Week	1888. Year.	1887. Year.
TONS OF 2240 LBS.			
P. & Read. RR. Co..	205,717	5,156.825	5,556 051
Cent. R. R. of N. J.	124 466	4.247,123	3.756,326
L. V. RR. Co.	170.791	5,073,683	4,853,445
D., L. & W. RR. Co.	164,789	5,112.644	4,225 734
D. & H. Canal Co..	87,788	3,389,530	2,903,023
Penna. RR.	56.165	3,391.957	2.795,977
Penna. Coal Co	44,045	1,287.409	1,149,091
N. Y., L. E. & W.	14,000	654.087	583,514
Total	867,761	28,313,258	25,853,161
Increase		2,460,097	

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:

1883	24,431,039	1885	22,830,615
1884	23,288,227	1886	23,630,201

Production of Bituminous Coal for week ended October 6th, and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

	1888. Week.	1888. Year.	1887. Year.
Tons of 2240 lbs.			
Phila. & Erie RR.	1.093	48,146	14,319
Cumberland, Md.	73,960	2,727.076	2,424,687
Barclay, Pa	800	119,280	141.490
Broad Top, Pa.	8,000	266.522	249,063
Clearfield, Pa.	69.937	2,565,364	2,406,943
Alleghany, Pa.	17,545	595,076	651.730
Pocahontas Flat Top	26,459	1,056,152	763,534
Kanawha, W. Va.	41,254	1,220,112	1,040,285
Total	239,048	8,597,728	7,692,051

WESTERN SHIPMENTS.

Pittsburg, Pa	16.070	543,917	425.959
Westmoreland, Pa.	31.149	1,166,623	1,064.721
Monongahela, Pa	4,857	306,302	285,187
Total	52,076	2,016,842	1,775,867
Grand total	291.129	10.614.570	9,467,918

Production of Coke on line of Pennsylvania RR. for week ending October 6th, and year from January 1st, in tons of 2000 pounds: Week, 85,706 tons; year, 3,005,260 tons; to corresponding date in 1887, 2,698,427 tons.

Anthracite.

The coal trade continues in excellent condition, and the demand for domestic sizes is still quite active. Stove and chestnut are in most demand, the call for chestnut possibly weakening a little. Egg coal is a little less active, and broken and pea coal are abundant and hard to sell.

The companies, of course, continue firmly their quotations as per their last circular, but there is a good deal of broken coal that can be bought below the quotation, and a little of egg and chestnut can also be had at a reduction. The demand is considered fair, and the requirements for consumption of all kinds of coal are larger than might have been expected, considering the heavy output of the last four months.

The statistics which were published in our issue of September 22d, it appears were not quite correct as regards the amount of stock on hand. Instead of there having been 704,101 tons on July 31st, 1888, it appears that there were 588,469, and the reduction in stocks was, therefore, 189,717 tons, instead of 307,359 as reported.

For the week ending September 29th the output of coal was 985,394 tons, which is claimed to have been the heaviest output in any one week thus far.

It is noticeable that the Reading Company reports a rapidly increasing output, much to the surprise of those familiar with the condition of the mines. There is no doubt but that the company is now expending a very large sum on deadwork, which should have been kept up throughout the year; but it will take a good deal of time and money to put the mines in a condition to increase their capacity, or even to maintain it. There is, therefore, some incredulity expressed in discussing the figures which are now put forward as the production of the company's mines. Moreover, we learn that the company has cancelled a number of its Eastern contracts from inability to fill them.

The other companies are pushing production to their utmost limit, but during the present week this limit in the Wyoming Valley will be greatly lessened, owing to the terrible disaster on the Lehigh Valley road, by which a number of miners lost their lives, and in consequence of which many of the mines have been idle, or their production limited while the miners attend the funerals of the victims. This is estimated to reduce the production of some of the companies nearly one half this week.

The question of anthracite freights which has been agitated in the Wyoming region, and somewhat also in the Lehigh, still continues to attract attention. It is understood that Coxe Brothers & Co., in the Lehigh, maintain that the rates on anthracite should be the same as on bituminous coal, while Messrs. Haddock, in the Wyoming region, limit, we believe, their demands to a reduction on the steam sizes, for which the price is much lower than on domestic coal. In any event this question is likely to attract more and more attention until it is settled by the companies interested, and we believe it would be the part of prudence on their side to meet the reasonable request of the operators by making substantial reductions on the low-priced sizes of coal.

The fairer method of regulating railroad rates would be to base them upon the market price of each size of coal, the same to be determined by an inspection of the books of a number of different dealers, who might be selected by lot, out of a large number, as are the mines which establish the rates of wages in the Schuylkill region under the sliding scale basis.

The question of the waste of coal in mining, to which we have referred editorially recently, has attracted a good deal of attention among the managers of some of the companies, and it is to be hoped that it will awaken them to a sense of their responsibilities, as well as to a better appreciation of their own interests.

We continue our quotations, which are fully maintained by the companies, as we have already stated, but which are shaded to a somewhat growing extent by the individual operators:

Broken	$3.95	Chestnut	$4.65
Egg	4.30	Pea	$2@$2.25
Stove	4.65		

During the next month, and possibly on into De-

cember, a fair market for coal is expected, but after the close of navigation a decline may be anticipated, unless the production should be limited more rigidly than it was during the early portion of the present ear.

The Western market continues to take all the coal hat can be shipped to it, and in fact, is far from being satisfied with what it gets. There is, however, no anticipation of any famine in the West such as was experienced last winter. The stocks of coal are more generally distributed, and are larger than they were a year ago.

Bituminous.

There is absolutely nothing worthy of note in the bituminous coal trade. Everything moves along at its steady pace without any large orders to disturb the regularity in prices.

Our usual quotations are obtained, and in some cases a little more. The prices are as follows: $2.60 f. o. b. Baltimore and Georgetown, and $3.25 for New York Harbor.

Boston.

[From our Special Correspondent.]

Too high prices and too little coal make Boston a dull port as far as wholesale trade is concerned. There is something doing, but there is no rustling about it. Those retailers who are getting out of coal give a few orders to the market, but they will buy cargoes afloat every time they can. This shows that there is no special confidence in the situation. Sales for immediate delivery still command full circular figures in most cases, but there are plenty jobbers and individual operators who are now ready to speculate on the situation. They will take orders, for delivery the first of November, or, in some cases, the last of October. Unless the experienced observers are badly mistaken, lower figures may be confidently counted upon for the rest of the year. As before, the greatest weakness is in broken, which is in abundant supply. Egg coal is also fairly easy, but the domestic sizes—stove, nut—are still hard to obtain promptly, particularly so with some companies.

The greater part of the soft coal trade has rejoiced to hear that some of the parties who went in and took a tremendous tonnage at cut prices are not having coal enough from their own mines to meet their contracts, to say nothing of new orders, and are actually having to buy from their competitors. It is needless to say that there is not much profit in such business. The bituminous market is a trifle firmer, quoting delivered prices at $3.35@$3.60.

The tendency in freights continues upward, and steadies the coal market to some extent.

We quote vessel rates, exclusive of discharging: New York, 80@85c.; Philadelphia, 90c.@$1; Baltimore, $1@$1.05; Newport News and Norfolk, 90c.@$1; Richmond, $1.15@$1.25; Provincial, $1.60@$1.75.

Boston retailers are active again and every one is rushed. Quotations remain steady. Delivered prices are: Stove and Nut, $6.50; Egg, $6.25; Broken, $6; Franklin, all sizes, $7.75; Lehigh Egg, $6.50; Broken, $6.25. Wharf prices 50 cents less than the above. Bituminous coal, $4.25 on the wharf.

Buffalo. Oct. 11.

[From our own Correspondent.]

The anthracite and bituminous coal markets are without new features; prices steady with demand for shipments by lakes in excess of the facilities for doing so. Dealers in bituminous coal feel that they will obtain fairly remunerative figures for the several varieties this fall and winter, and that consumption will be good, as manufactureres and other consumers predict active times in their several departments of business. There is a slightly better supply of cars, but the total available is nothing like what shippers desire, but they live in hopes. The small dealers are busy filling orders for domestic use.

Coke without changes of consequence.

Over a year since one hundred of the business men of this city united their subscriptions and offered $100,000 to the engineer or inventor who would devise a practicable plan by which the force of the tremendous flood of water that passes our doors as it were could be utilized, or in other words, "harnessed." This evening a meeting will be held for organization and to arrange for the consideration of the hundreds of plans that have been sent in, and innumerable communications received. The officers will have a task of no small magnitude before them.

Vessel men entertain the belief that from now until the close of navigation about 600,000 net tons of coal will be shipped hence to Western ports, provided the demand continues as good as at present, and a larger quantity if the receipts increase, which they may do if rail transportation facilities are better.

Lake freights opened on Friday very strong, vessel men seeking an advance to Lake Michigan ports in consequence of the low grain rates ruling from those places, and the arrivals of craft light. Finally 20c. higher rates were paid to Racine, 15c. to Milwaukee and Toledo and 20c. to Chicago. Large contracts made for the latter port. Closing to-day firm, and good demand for vessels, with not enough coal here to go round. The figures for the week were as follows: $1 to Chicago; $1@$1.10 to Racine; 90c. to Milwaukee; 60c., and on contract, to Duluth, Superior, Washburne. Ashland and Marine City; 75c. to Marquette, Sault Ste. Marie and Gladstone; 25@40c. to Toledo; 40c. to Bay City; 50c. to Saginaw and Alpena; 25c. to Detroit, and to Green Bay on owner's account.

The shipments by lake westward from this port from October 4th to 10th, both days inclusive, were 71,945 net tons, namely, 30,480 to Chicago, 19,310 to Milwaukee, 2200 to Superior, 650 to Toledo, 1850 to Detroit, 3800 to Racine, 620 to Ashland, 2000 to Duluth, 110 to Bay City, 2350 to Green Bay, 800 to Sault Ste. Marie, 2100 to Gladstone and 70 to Alpena. The total shipments thus far this season about 1,940,368 net tons, including cargoes on vessels from Tonawanda not reported at Buffalo Custom House.

The receipts by canal here of coal for first week in October, 2389 net tons, and the shipments 235 net tons.

Pittsburg. Oct. 11.

[From our own Correspondent.]

Coal.—The rise came, but was not sufficient to send out barges, the lower landings are being filled up with coal ready for the first rise. Most of the miners are at work in the various pools. It is to be hoped that they will continue until all empties in the pools are loaded. There is no scarcity of coal in the lower markets. Coal is selling at low prices.

PRICE OF COAL PER 100 BUSHELS = 7600 LBS.

First pool	$4.75	Fourth pool	$3.25
Second pool	4.25	Railroad coal	5.00
Third pool	3.75		

Connellsville Coke.—The shipment and production of coke continues to increase. Tons last week, 113,115; this week, 115,545; increase in ovens, 128; week's increase in tons, 2430. Increase shipment cars aggregate 6393, the situation being as follows: Old contracts are being filled at contract prices; new contracts are refused unless at the advance.

The new rates are: Blast-Furnace, $1.25 per ton; to dealers, $1.35; foundries, $1.40.

Freight rates to Pittsburg, 70c. per ton: to the Mahanoy and Shenango valleys, $1.35; East St. Louis, $3.20; to Cleveland, $2.80; to Chicago, $2.75; to all other points the same proportions.

FREIGHTS.

The latest charters to October 5th, per ton of 2240 lbs.

From New York to:—Bangor, .90@$1*; Bath, .90@$1*; Beverly, .85@.90*; Boston, .85@.90*; Bridgeport, Conn., .70; Bristol, .90; Cambridge, Mass., .90*3c.; Cambridgeport, .90*3c.; Charlestown, .90*; Chelsea, .90*; Com. Pt., Mass., .90*; E. Boston, .90*; E. Cambridge, .90*; E. Greenwich, R. I., .60; Fall River, .80@.90; Hartford, .90; New Bedford, .90@$1; Newburyport, 1.10; New Haven, .70; Newport, .85@.90; New York, .25†; New London, .80@.85; Norwalk, Conn., .70; Norwich, .90; Portland, .80@.85*; Portsmouth, N. H., 1.10*; Providence, .85@.90; Quincy Point, .90*; Salem, $1*.

From Philadelphia to:—Annapolis, .70; Bangor, 1.25*; Baltimore, .60†; Bath, Me., .95*; Boston, .90@1.05*; Cambridgeport, 1.15*; Charleston, 1.00; Charlestown, 1.00*; Chelsea, .95; Com. Point, Mass., .95*; East Cambridge, 1.12*; Fall River, .80@.90*; Gardner, Me., 1.15@1.20*‡; Galveston, 3.00; Georgetown, D. C., .85; Gloucester, 1.05@1.17*; Lynn, 1.10@1.30*; Marblehead, 1.05*; Medford, 1.10*; Milton, 1.20*; New Bedford, .80@.90*; Newburyport, 1.20*; Newberne, .80; New York, .90†; Norfolk, .65; Portland, 1.05@1.15*; Portsmouth, N. H., 1.00*; Portsmouth, Va., .65; Providence, .80@.90*; Richmond, Va., .75; Rockport, 1.22½*; Saco, Me., 1.25@1.30*†; Salem, Mass., .90*; Savannah, 1.00@1.10; Washington, .85; Weymouth, 1.15*; Wilmington, N. C., .60.

From Baltimore to:—Bangor, Me., 1.30@1.40; Bath, 1.30@1.40; Boston, 1.25@1.30; Bridgeport, Conn., 1.10@1 15; Brooklyn, .95; Charleston, 1.10@1.15; Fall River, 1.15@1.20; Galveston, 3 00; Gardner, Me., 1.00@1.10; New Bedford, 1.10; Newburyport, 1.30@1.40; New Haven, 1.10@1.15; New London, 1.10@1.15; New York, 1.00@1.05; Portland, 1.25@1.30; Portsmouth, N. H., 1.30@1.35; Providence, 1.10@1.15; Quincy Point, 1.10; Richmond, Va., 70; Salem, Mass., 1.25@1.30; Savannah, 1.25; Somerset, 1.15; Williamsburgh, N. Y., 1.00@1.10; Wilmington, 1.10@1.20.

* And discharging. 3c. per bridge extra. † Alongside. ‡ And towing.

METAL MARKETS.

NEW YORK, Friday Evening, Oct. 12.

Prices of Silver per ounce troy.

Oct.	Sterling exchange	Lond'n Pence.	N. Y. Cents	Oct.	Sterling exchange	Lond'n Pence.	N. Y. Cts.
6	4.88¼	43	93⅞	10	4.88¼	43⅛	94
8	4.88	43⅛	94	11	4.88	43	93⅞
9	4.88	43⅛	94	21	4.87¾	43	93⅞

Market this week without special feature. Tendency for weaker exchange.

The Currency Commission reports are ready for presentation to Parliament. The members are equally divided. Six, including Lord Herschell, Sir Thomas Farrer, Sir John Lubbock, and Mr. Courtney sign a statement supporting the gold standard. The other six, including Messrs. Balfour, Chaplin, and Mallet advocate the adoption of the bi-metallic standard in a modified form.

Foreign Bank Statements.—The governors of the Bank of England, at their weekly meeting, made no change in its rate for discount, which remains at 5 per cent. During the week the bank gained £329,000 bullion, and the proportion of its reserves to its liabilities was raised from 33·78 to 34·26 per cent, against an advance from 38·64 to 41·59 per cent in the same week of last year, when its rate for discount was 4 per cent. Thursday the bank gained £300,000 bullion on balance. The weekly statement of the Bank of France shows losses of 14,975,000 francs gold and 8,450,000 silver.

Copper.—There have been several transactions in Lake copper during the week, amounting in total to probably 300,000 pounds at 17½, which under present conditions must be regarded as rather a large quantity. Some of the dealers were the sellers probably, because they are unable to get from consumers the speculative price now established on the Metal Exchange, and the lots were taken by one of the speculative brokers in the hope, perhaps, that before the close of the year some more shorts may have to be covered, and this will afford a good opportunity for giving the bears another squeeze. Beyond these there are no other transactions worth reporting. The good demand for casting copper continues, and the producers now decline to book orders at 16c. They appear to be well sold for some weeks to come. In London Chili bars have continued their downward course, and close to day at £82 to £83 for Spot, and £78 10s. for three months; but apart from this special movement the European copper markets remain very steady. G. M. B. is £77 5s.@£77 10s. for Spot, and £78 for three months. Best Selected, £81 to £82, and Strong Sheets, £85. The inquiry on the part of consumers is said to be fair, and there has also been some demand for India lately, but so far the exports to that destination are only light.

Seven carloads of copper ore from mines in Mexico arrived over the Mexican National in Laredo, Texas, recently, consigned to Liverpool, Eng.

Tin.—The London market has again ruled the course of prices, and whilst both mail and cable advices report a scarcity of the metal on Spot, prices have evinced a downward tendency. At the close of last week the London quotation for Spot tin was £101 5s., and to-day we have to quote Spot $100 5s. to £100 10s., and 3 months £100 10s. to £100 17s. 6d. Our market has been very irregular during the week, and fluctuations have been rather considerable; and in view of the weaker tone in London holders have shown more disposition to realize, and in spite of Spot parcels being scarce lower prices have been accepted. Our closing quotations to-day are: Spot, 23⅛@23¼; October, 22⅞@23; November, 22⅞; December, 22⅞.

Lead.—Just a fortnight ago, at the beginning of this month, it seemed as if the operators for the rise had it all their own way, and would be able to dictate their own prices for the metal, but as time passed and the deliveries for October became heavier than anticipated the "bulls" became rather shy, and during the greater part of the week the market has been quite spiritless, and yesterday it became thoroughly demoralized. On the 4th inst. we reported prices down to 4·85, and then within the next few days the quotation was bid up to 5·10, after which followed a relapse until yesterday it was freely offered at 4·80, with the tone exceedingly flat. To-day, however, the "bulls" came on again with fresh courage, and amidst spirited bidding the price was again put up to 4·92½, and so the game goes on. Under these circumstance it is quite impossible to predict what a day may bring forth, but it is evident to the most superficial observer that the market is far from a sound condition. Our closing quotations to-day are: Spot, 4·90; October, 4·92½; November, 4·80@4·85; December, no buyers.

It is reported that the London price, which has been standing pretty steadily at £14 10s., is off a little. Some considerable purchases are said to have been made there for American account, and some of this lead is now on the way over. It would seem, therefore, that the bulls here are not to be allowed to impose their own terms without interference.

Chicago, Ill.—Messrs. Everett & Post telegraph us to-day as follows:

The market has been very quiet; the nominal price is 5 cents. There was really nothing done at the close. Spot was offered at 4·90c. and futures at 4·80c., but there were no takers.

Spelter.—Demand on the part of consumers continues very satisfactory, and the quantity available is very limited. The important and rapid fluctuations in the lead market, however, tend to delay purchases. We still quote Domestic 5·10@5·20, and Silesian 6⅛@6¼. The London quotation for good ordinary brands is £19.

Antimony.—Makers have again raised their prices and Hallett's is now held in London for £42 10s., but nothing can be bought for delivery before November. Early in the week several parcels of Hallett's changed hands at 10¼, but price has now been advanced to 10⅜@10½. Cookson's is obtainable at 14c.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Oct. 12.

Heavy Chemicals.—The market for heavy chemicals has been somewhat steadier this week, although prices still show an upward tendency, and consumers do not appear to realize that the present advance is permanent. Consequently they buy very sparingly and only for immediate requirements. This lessens very materially the volume of trade and rather checks any great advance in the New York market. However, as the stocks here are very limited, it is probable that if the combination of alkali manufacturers abroad should advance prices still further, the New York market would score a sharp and decisive rise in values. The true condition of the trade would then be presented to consumers very plainly. Among New York dealers the opinion is very general that a period of high prices is at hand.

Liverpool advices report the English market in substantially the same condition as last week. Supplies are limited, the caustic soda makers will greatly decrease their production, and prices, of course, are very firm, with an upward tendency. The reported combination of chlorate of potash manufacturers shows that there is a tendency toward

combination in all lines of the alkali trade. Bleaching powder is controlled by a strong syndicate; the caustic soda makers have entered into an agreement to decrease production, and now the chloride of potash manufacturers are reported to have formed a pool. It is true that with the increased price of salt, the primary article, these combinations have been inevitable, and were the production of soda ash as easily restricted we would have, perhaps, still another "trust."

Caustic soda remains practically unchanged in price, although the market is very firm. Considerable business has been done at 2·35@2·40c. for the higher tests, 70@74 per cent. Sixty per cent has not received as much attention, but prices are firm at 2·50 @2·62½c. according to quantity. On the spot, the quotations are purely nominal.

Liverpool carbonated soda ash, 48 per cent, is firm in sympathy with the general tone of the market, rather than from any marked increase in the demand. Current quotations are 1·25@1·27½c. to arrive, and 1·27½@1·30c. on the spot. Newcastle soda ash is also firm at 1·22½@1·27½c. to arrrive and 1·30c. on the spot.

Caustic soda ash is quiet at 1·27½@1·30c. to arrive and 1·32½@1·35c. on the spot.

Sal soda appears to be in greater demand, and prices are firmer. This week's quotations for stock on the spot are ·95@1c., and ·97½ to arrive.

Bleaching powder is very scarce and prices have scored a sharp advance. Very little stock is offered either on the spot or for shipment. The market may be written 2·18¼@2·25c. on the spot, 2·10c. for early arrivals, and 2·06¼c. for shipment.

Acids.—The market is quiet, and little change is to be noted either in the volume of business or in prices.

Acetic acid is held at 2¼@2½c., according to quantity and quality.

Nitric and muriatic acids are lightly dealt in at the old figures. Ruling prices are about as follows: Muriatic, 18°, 1·10@1·15c.; 20°, 1·25@1·30c.; 22°, 1·50c. Nitric acid is held as follows: 36°, 3¾c.; 38°, 4c.; 40°, 4½c.

Oxalic acid is not wanted to any great extent at present. Nothing more is heard of the further advance in prices which was talked of some time ago. Probably manufacturers think such a step inexpedient at present, owing to the rather limited inquiry. The market price is 8½c. per pound for large lots.

Tartaric acid is quiet at unchanged prices. This week's quotations are as follows: Crystals, in lots of 3000 lbs. or more, 43c. per lb.; smaller quantities in barrels, 44c. per lb.; 50-lb. lots in boxes, 45c. per lb., and one cent advance on these figures for powdered.

Sulphuric acid is firmer, owing to the increased cost of raw materials. With the constantly increasing price of nitrate of soda, manufacturers declare that they can not afford to offer sulphuric acid at present prices, and that an advance in prices is inevitable. Whether they do so or not remains to be seen, but it is at least certain that with the present excessive competition any attempt to advance prices may entail a loss of trade. The only encouragement to such a step is in the limited stocks in the hands of both manufacturers and consumers. The latter have been buying lightly of late, and if manufacturers should agree upon a certain advanced price, they would be obliged to stand it in order to meet immediate requirements. As yet, prices are not materially changed from last week's figures.

Fertilizers, Potashes, etc.—As a rule, there is little complaint as to the present condition of market, although in some quarters we have heard rumors of manufacturers cutting rates, etc.

This week's quotations are about as follows: Azotine, $2.40 as to quality; dried blood (city), low grade, $2.40@$2.45 per unit; Western high grade, $2.40@$2.50 per unit for ground material; tankage, high grade, $23@$25 per ton; low grade, $21@$22 per ton. Fish scrap, $24@$25 per ton f.o.b. factory. Sulphate of ammonia, $3.25 per cwt.

Refuse bone-black is quoted at $18 per ton. Dissolved bone-black is 90c.@$1 per unit for available phosphoric acid, and acid phosphate 75@80c. per unit for available phosphoric acid.

Steamed bones, unground, $19; ground, $25.

Charleston rock, undried, $5 per ton; kiln dried, $6 per ton, both f.o.b. vessels at the mines. Charleston rock, ground, is held at $10@$10.50 ex steamer at New York.

Muriate of Potash.—Supplies are limited at unchanged prices. We quote $1.80@$1.85 for spot and arrivals.

Double Manure Salts.—The market remains about the same as last week, transactions being small owing to the limited supply. Prices are unchanged. Sulphate of potash is scarce and prices are consequently high.

Kainit.—Freight rates are still very high, and the supply on the spot is limited. The New York agent of the syndicate estimates that there are from 150 to 200 tons in store, and that 1000 tons have arrived during the week, all of which was sold before arrival. The nominal quotations on the spot are $10.50@$11, and $9.50@$9.75 for shipment.

Brimstone is very scarce on the spot, and freight rates continue very high. The nominal quotations are $25 on the spot, $24 to arrive near by, and $19@$20 for shipment.

Nitrate of Soda.—Prices have again been advanced. The market is very firm in tone. Sales this week are estimated at 10,000 bags, which decreases the amount on the spot to about 60,000 bags.

Quotations for spot are in the neighborhood of 2·25c., while to arrive is held at 2·12½@2·15c. The following interesting statistics are prepared by Messrs. T. F. Edmunds & Co., dated Boston, September 30th, 1888:

NITRATE OF SODA.

	1888. Tons.	1887. Tons.	1886. Tons.
Exports from S. A. to Europe since Jan. 1	396,092	335,764	200,194
Exports from S. A. to U. S. since Jan. 1	53,265	56,731	55,441
Total exports	449,357	382,495	255,635
Loading in S. A. for Europe, Sept. 30	100,000	100,000	60,000
Loading in S. A. for U. S., Sept. 30	6,000	2,000	3,000
Total loading	106,000	102,000	63,000
		Bags.	Bags.
Stocks at Atlantic ports, September 30, 1888			83,767
Afloat and due in Atlantic ports, October.		52,000	
Afloat and due in Atlantic ports, November		37,000	
Afloat and due in Atlantic ports, December		30,000	119,000
Visible supply for U. S. Oct. 1 to Dec. 31, 1888			202,767
Visible supply for U. S. Oct. 1 to Dec. 31, 1887			180,000
Deliveries for consumption in U. S. for above time in 1887			90,785
Deliveries for consumption in U. S. for above time in 1886			122,867
Deliveries for consumption in U. S. since Jan. 1, 1888			347,600
Deliveries for consumption in U. S. since Jan. 1, 1887			376,000
Deliveries for consumption in U. S. since Jan. 1, 1886			290,699

Minerals.—Prices as a rule are a little firmer and the volume of business is not large.

Chalk.—Very little is offered.

China Clay.—A fair trade is reported, with less supply of American clay on the market.

Feldspar and Silica.—There is an improved demand for both articles, indeed, greatly in excess of the supply.

The English Salt Trust.—Considerable interest has been excited in England by the reported intention of the leading salt manufacturers of Cheshire and the adjoining salt producing districts of Durham and Worcestershire to form a trust and control both the production and price of this article of consumption. The actual forming of the "Salt Trust" is announced with the further intelligence that the entire capital, £3,000,000, has been subscribed. In many respects the American plan is copied, as follows: The business of each individual manufacturer is valued by a competent valuer, and the manufacturer receives a certificate representing three or four times the amount of this valuation, which is considered to be his share of the capital, and upon which he is entitled to receive dividend. The manufacturer remains in charge of the works as local manager, and receives instructions from time to time as to the amount he must produce, and the price at which it must be sold from the "general board." The dividends continue to be paid whether the works are operated or shut down.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Oct. 12.

The market this week presents no new features and the trade generally is in about the same condition as last week, and indeed the same as it has been for months past. The season for most building operations will soon be at an end. It seems probable that the year will close without startling developments in any line of the trade. On the whole, the year has been one of healthy activity based upon satisfactory industrial and financial conditions and not upon the wild speculations that have characterized the market for several years past.

Bricks.—What has been said of the market for weeks past could perhaps be repeated with equal truth at present. The features are the same, although, as the season nears its end and production decreases, the over supply in the market is less apparent, and consequently sellers are disposed to stiffen prices. In some instances 25 cents more is asked for Haverstraws. How far prices may be advanced is not yet clear, but it should be remembered that the building season soon closes, and if any profit is to be realized from the advanced prices, it will be literally a case of "making hay while the sun shines."

Cement.—A strengthened demand for American cement is reported, with prices a little firmer accordingly. The market for imported cement is in an unsettled condition. The superior brands seem to be readily taken, while stocks of other brands are reported largely in excess of the demand, thus exerting a rather depressing effect upon the market.

Lime.—The arrivals during the week, although not of large proportions, seem to have satisfied the wants of consumers. Prices are at the old rates, with apparently little disposition either on the part of buyer or seller to alter them.

Roofing Slate.—Old dealers say that this year has proven the best during the last fifteen years from a business point of view. Never has there been such a demand for Pennsylvania slate, which at present is extremely scarce. This advance is attributed to the fact that when the "combination" of Vermont quarrymen increased their prices for green roofing, consumers ordered the Pennsylvania slate instead, thus greatly augmenting the demand for the latter and producing the present limited supply. This week, prices are very firm, with an upward tendency.

For latest prices of building materials and wages of laborers see our "Current Prices" on another page.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Oct. 12.

American Pig Iron.—Furnace agents and dealers report a continued steady demand in moderate quantities. Orders now being placed are, as a rule, not for very large lots. On the other hand, the makers of pig iron do not show any anxiety to place large orders for forward delivery at present prices. The current quotations are firmly maintained and a general advance of 50 cents a ton equal to the present advance above prices of a few weeks ago, would not be a surprise to those best informed of the tendencies of the market. Southern irons continue in excellent demand, although there is no excess of Southern foundry iron seeking an outlet or pressed for sale in this market, as was the case a few weeks ago.

Scotch Pig.—To-day's cables show a further slight decline in warrants and in the leading brands sold on the Glascow Exchange. The demand here remains moderate, with prices a little firmer for most brands, and more nearly corresponding to Glasgow figures, the latter being lower. Freights are unchanged at about 10s. Summerlee is still quoted the highest of the brands usually imported, but the quotation of $22@$22.25 is merely nominal, as there is none here.

Bessemer Pig is without interests, and we do not hear of any domestic offering. Foreign is out of the question at present prices.

Spiegeleisen has been in more demand, and there have been some sales of English at about $27 for later shipment. Earlier lots are quoted higher.

Steel Rails.—There has been a decided increase in the inquiry during the past week. There is a large number of small orders on the market, an order of 25,000 tons from one of the trunk lines, and a Western road is asking figures on a 10,000 ton order, with option of increase to 20,000 tons. Only a few of the mills are willing to book orders for forward delivery at present prices, the belief being that spring prices will be higher than those now prevailing. It is not likely that this year's product will much exceed 1,200,000 or 1,300,000 tons, instead of 1,500,000 tons, as stated in our last week's issue.

The small orders placed during the week will aggregate several thousand tons. Orders have been placed at Chicago by the Chicago, Burlington & Quincy R. R., for 20,000 tons, and by another road for 10,000 tons. A Massachusetts road has bought 8000 tons, and a Western New York road has placed an order for 4000 tons. The aggregate sales during the week will thus amount to nearly 50,000 tons.

There is no change to note for *Structural Iron and Steel*, and for *Steel and Iron Plates* the demand continues very good. Prices are well maintained, and those mills which have a reputation for good work are busily employed filling orders.

Cast Iron Pipes.—The foundries are doing a good business, some of them reporting an output fully equal to that of 1887.

Old Rails.—There remains the same divergence of reported views of buyers and sellers which has characterized this article for months past. We have pointed out the near approach of the price of old iron rails to that of new steel rails, and it appears that several railroads are taking advantage of the situation in preparing to relay at comparatively small net cost. If this movement continues to any great extent its effect will soon be noticeable on both sides, and prices will diverge again. Thus far, however, the effect on either market is hardly appreciable, except that old rails are perhaps a little weaker in price from railroads. Quotations by strong holders are above the highest figures quoted this week.

For current quotations see our weekly register of prices.

Louisville. Oct. 9.

(Specially reported by Messrs. HALL BROTHERS & CO.)

The market has displayed a little more animation during the last week than the week previous. Inquiries and sales have been for larger quantities; prices remain unchanged. Furnaces, as a rule, are well sold up for considerable time into the future, and cannot make very early shipments, although there are still a few that can meet prompt delivery requirements, which has been the main demand. Quotations for cash, f.o.b. cars at Louisville, will be found in our weekly register of prices.

Philadelphia. Oct. 12.

[From our Special Correspondent.]

Sales of steel rails for the past six days for large and small lots foot up 22,000 tons. Increased interest is manifested in rails both in the West and East, and the probabilities of large transactions are stronger now than at any time for six or eight months. It is not known what the obstacle is in the way of an immediate placing of orders, as makers have named the lowest possible quotations, which are $28 at mill. Rail authorities are reticent as to whether offers have been made at anything less. Several Southern railroads have been offering old rails on track to be exchanged for new rails, but so far as learned no more than six or seven thousand tons have been contracted for. Prices are declining. The general run of buyers of old rails are unwilling to pay the outside prices asked this week. Large transactions are regarded as quite probable within a few days. Very little business has been done in foreign material.

Importers have been doing some cabling with a view of making terms. Some little business is being done in Scotch iron. Sales of Spiegeleisen are likely to be made in the next week. The bar mills have not been increasing business as rapidly as during September. Still, several small orders

were placed in mills during the past six days. Prices are well maintained, and manufacturers look for a further hardening tendency. Stores are quoting a tenth higher. A good many orders for cars will be placed before the close of this month, but the car builders will not place orders for bar iron until later in the season, anticipating some sharper competition in November for business.

The improvement in plate and tank has been disappointing. The only advantage gained is that for small lots. Prices are at the outside figures. A large amount of work is said to be in sight, and Delaware ship builders will be heavy buyers of material during the coming winter. Efforts to close business now for future requirements have failed. A good deal of business is being done in structural iron, although few individual large orders have been placed. Wrought-iron manufacturers report a strong demand. Merchant steel is also strong in price, and a great many orders have been booked within a few days. Muck bars are very firm at quoted rates and the $30 limit does not seem very far off; in fact, it is thought it will be reached very soon. Some orders at $29.50 were declined yesterday, though business has been done at as low as $29. Nothing of an encouraging nature has taken place in the pig iron trade. Large orders are exceptional. Forge iron buyers have all the material they care to contract for unless they can secure stocks at lower prices than now are asked. There is some difference of opinion as to future probabilities. Makers and sellers if they would secure large orders could do so only at what buyers would regard as concessions. Skelp iron is very strong; the manufacturers are well sold up. Wrought iron pipe makers are adding to their orders. Nails are fluctuating as to demand, but good prices for established brands are maintained.

Pittsburg. Oct. 11.

[From our Special Correspondent.]

Raw Iron.—The past week brought out the fact that there was a steady trade demand for certain descriptions of iron, while for others buyers showed a disposition to hold off in the hopes that sellers would either shade prices or offer other inducements that would be about the same. As a general thing prices are satisfactory to the seller and to a certain extent to the buyer also. We have learned of offers for lots aggregating several thousand tons at prices that were not acceptable to the party most interested. The result was both sides decided to wait developments. Under these circumstances a falling off in transactions was the result. At the same time consumption is immensely large and is fast consuming the large transactions reported in this paper during the past two months. On the whole the outlook for the fall and winter trade is of the most encouraging kind. Parties well versed in iron matters are firm in the opinion that activity and fair prices will be the rule for some time to come, that an increased volume of business will be permanent, that a strong market seems to be inevitable. Reports from furnaces in the Shenango and Mahoning valleys continue favorable to makers. Many of them have sold so far ahead that it will require the early part of the new year to complete the orders on hand. We learned of one sale of 6000 tons Bessemer for an Illinois firm the delivery to commence in January at good figures. City furnaces are in full operation. Most of them still employed on former contracts. The situation: Gray Forge, standard brands, in good demand; rather scarce. Bessemer—we hear of sales a shade below last week's figures. Muck bar prices maintained with a lighter demand. Steel slabs and billets less inquired for. Skelp iron firm at current rates. Old iron rates are without quotable change. Scrap material—a good many lots are being disposed of at favorable prices. Old rail—fair inquiry.

Coal and Coke Smelted Lake Ore.

1000 Tons Bessemer	18 00 cash.
1000 Tons Gray Forge	16.50 cash.
1000 Tons Gray Forge, Valley Furnace	16.00 cash.
1000 Tons Gray Forge	16.50 cash.
600 Tons Gray Forge	16.25 cash.
500 Tons Bessemer No. 3	18.00 4 mo.
500 Tons Gray Forge	16.00 cash.
500 Tons Gray Forge	16.00 cash.
500 Tons Bessemer	17 75 cash.
500 Tons No. 2 Foundry	17.25 cash.

Coke Native Ore.

500 Tons Gray Forge	16.00 cash
225 Tons Gray Forge	16.50 4 mo.
200 Tons No. 1 Foundry	18.00 cash.
200 Tons Gray Forge	15 85 cash.
200 Tons Gray Forge	16.50 cash.
200 Tons No. 1 Foundry	18 00 cash.
50 Tons Silvery	17.00 cash.
50 Tons No. 2 Foundry	17.25 cash.
50 Tons No. 2 Foundry	17.00 cash.
50 Tons Mottled Extra	16.00 cash.
25 Tons No. 1 Foundry	18.20 cash.

Ferro-Manganese.

50 Tons 80 per cent	56.00 cash.
50 Tons 80 per cent	56 00 cash.
30 Tons 80 per cent	56.50 cash.

Steel Slabs and Billets.

500 Tons Billets, November	29.50 cash.
700 Tons Steel Slabs	29.00 cash.
300 Tons Billets	29.50 cash.

Muck Bar.

1000 Tons Neutral, October and November	29 50 cash.
500 Tons Neutral	29.25 cash.
500 Tons Neutral	28.50 cash.
500 Tons Neutral	28.75 cash.

Steel Wire Rods.

575 Tons American Fines	43.00 cash.

Skelp Iron.

700 Tons Narrow Grooved, per 100 pounds	1.87½ cash.
200 Tons Wide Grooved, per 100 pounds	1.97½ cash.
300 Tons Narrow Grooved per 100 pounds	1.87½ cash.

Old Iron Rails.

00 ons American Ts	25.25 cash.
0 ons American Ts	26.25 cash.

IMPORTS AND EXPORTS OF METALS AT NEW YORK OCTOBER 3 TO OCTOBER 8, AND FROM JAN. 1.

IMPORTS.

Spelter.	Week. Tons.	Year Tons.
American Metal Co., Lt.		303
Friedensville Zinc Co.		23
Hendricks & Bros.		56
H. Lamarche's Sons		6
Lewisohn Bros.	28	61
J. Macy's Sons		28
Muller, Schall & Co.	56	56
Naylor & Co.	83	214
Osgood, F.		83
Perkins, C. L		725
Pope's Sons & Co.		28
Total	167	1,583
Corres. date 1887		2,746

Zinc Sheets.	Tons.	Tons.
G. A. & E. Meyer		1
H. Lemanche's Sons		594
Milne & Co.		1
Naylor & Co.	56	137
Total	56	733

Pig Lead.	Tons.	Tons.
Caswell, E. A.		46
N. Corwith & Co.		111
Hendricks Bros.		122
Total		279
Corres. date 1887	150	3,433

Tin.	Tons.	Tons.
Abbott & Co., Jere.		3,448
American Metal Co.	90	479
Birdwell & French		89
Crooke S. & R. Co.	28	451
Davol & Sons		8
Dickerson, Van Dusen		10
Fuech, Edye & Co.		10
Hendricks Bros.	14	159
Knauth, W. & K.	16	37
Lehnaier Sons & Co.		25
Lewisohn Bros.		15
Muller, Schall & Co.	140	4,648
Nathan, Trotter & Co.		22
Naumann, F		8
Naylor & Co		1,496
Phelps, Dodge & Co.		849
Pope, Jas. E, Jr.	56	106
Pope's Sons & Co		124
Schwarer Bros.		7
Thomsen & Co., A. A.		28
Thomson & Co., D.		214
Total	494	12,361
Corres. date 1887	335	11,453

Tin Plates.	Boxes.	Boxes.
American Metal Co.		509
Bridge & Beach Mfg. Co.		339
Bruce & Cook	92	80,273
Byrne, James		44,677
Central Stamping Co.	220	29,460
Coddington & Co., T. B.	53	130,141
Corbierre, Fellows & S.		2,249
Cort & Co., N. L.	3,999	89,838
Cons. Fruit Jar Co.		849
Crocker Bros.		548
Crooks & Co, Robert		54,551
De Mill & Co., H. R.	588	17,360
Dickerson, Van Dusen	5,475	213,003
Dolly, T. G. F.		112
Fairbanks, N. H.		264
Hamilton & M.		362
Henly & Earle		38
Iron Clad Mfg. Co		119
Lalance & Grosjean	411	4,407
Lombard, Ayres & Co.		15,062
Merchant & Co	200	14,280
Mersick & Co., C. S.		4,906
Morewood & Co., G.		38,345
Naylor & Co		8,978
Newall Bros.		208
Phelps, Dodge & Co.	12,164	533,262
Potts, W. A., Son & Co.		573
Pratt Mfg Co		133,167
Saunders Bros.		330
Shepard & Co., Sidney	356	76,544
Smith & Lockwood	200	200
Somers Bros		768
Stroud & Co		686
Taylor, N. & G.		540
Thomsen & Co., A. A.	10,341	126,158
Warren & Co		1,665
Wheeler & Co.		6,483
Whittemore & Co., H.	205	43,542
Wolff & Reesing	1,222	24,072
Wright & Sons, Peter		165
A. M. Underhill		21
Total	35,526	1,699,643
Corres. date 1887	41,886	1,527,020

Pig-Iron.	Tons.	Tons.
Abbott & Co., Jere		600
Austin, B. & Co		100
Baldwin Bros. & Co.		100
Bartlett & Co., N. S.	200	4,700
Crocker Bros.	300	9,762
Crooks & Co., R.		750
Dana & Co.		600
Downing & Co.	200	251
Drum'nd, McCall & Co.		20
Erie Despatch		250
Foley, E		200
Henderson Bros		1,895
Holt, H. N		50
Irvin & Co., Richard		50
Knauth, N. & K.		15
Lee & Co., James		375
Milne & Co., A.		2,467
Naylor	151	5,868
Perkins, C. L		5
Pierson & Co.		15
Page, Newell & Co.		13
Pope, Jas. E., Jr.		150
Pratt Mfg. Co		10
Sanderson & Sons		2
Stetson & Co., G. W.	185	12,007
Tonsils, M. R.		120
Walbaum, W. H.		400
Williamson & Co., Jas.	100	4,100
Wright & Son, P.		20
Total	1,136	44,895
Corres. date 1887	2,232	120,188

Antimony.	Casks.	Casks.
Total	34	2,465
Corres. date 1887		3,015

Copper.	Pounds.	Pounds
Lewisohn Bros. from Liverpool		161,824
Nickel.	Lbs	Lbs.
McCoy & Sanders		169,586
Total		169,586

Steel Sheets, Billets, Forgings, etc.	Tons.	Tons.
Abbott & Co, Jere	10	1,975
Arkell, Jas		17
Belcher, H. U.		13
Bowker, C. F.		270
Bruce & Cook		7
Carey & Moen		24
Carter, G. T.	411	774
Coe, J. A.		16
Cohn, M		159
Cooney, D. J.		20
Crooks, R. & Co.		765
Crousbey, H.		236
Dana & Co.		1,352
Downing & Co., R. F.	30	415
Henderson Bros.		31
Holt, H. N		6
Hondolette & D.		136
Hugill, Chas.		175
Irwin & Son, Thos.		1
Lalance & G. Mfg. Co.		260
Lazard Freres		50
Leng, J. S.		53
Lebenberg, N.		36
Littlejohn, Jas.		40
Lundberg, G.		205
Mersick & Co.		128
Milne & Co., A.	5	1,702
Montgomery & Co.		52
Moore's Son & Co.		25
Muller, Schall & Co.		5
Manas, J. & Son		10
Naylor & Co.		10,800
Newton & Shipman		67
Ogden & Wallace	16	296
Phelps, Dodge & Co.		3
Phœnix Steel Co.		20
Pierson & Co	45	907
Pilditch, F. S.	7	330
Power, C. W		53
Pratt, Whitney & Co.		33
Prosser, Thomas	63	3,065
Roebling's Sons, J. A.		390
Sanderson & Son		42
Seaburg, C. B.		2
Shotts Iron Co.		15
Strouse & Co.		37
Temple & S.		10
Union Bridge Co		288
Wagner, W. F.	40	945
Walbaum, W. H.		2,479
Wallace, W. H & Co.		41
Webb, J. B		1
Wetherall Bros		2
Wetherill & Co		5
Wheeler & Co., E. S.		12
Whiting, E. W.		11
Whitney & Co.		51
Williams & Whitney		2
Wilson, J. G		112
Whittemore & Co		6
Wolff, R. H	34	316
Wright's Sons & Co.		10
Total	661	28,219
Corres. date 1887	450	72,223

Bar-Iron.	Tons.	Tons.
Abbott & Co., Jere	55	2,445
Abeel Bros.		3
Bacon & Co.		150
Hugh Cranshaw		1
Downing & Co.		151
Holt, S. N.	75	85
Jacobus, E. Y.		16
Lilienberg, N	11	16
Lundberg, Gustaf		700
Mersick & Co.		29
Milne & Co., A.		283
Naylor & Co.	320	515
Ogden & Wallace		4
Page, Newell & Co.		122
Philip, C. M		20
Stroud & Co.		8
Wallace & Co., W. H.		19
Wilson, J. G.		11
Totals	461	4,575
Corres. date 1887	861	12,526

Steel & Iron Rods.	Week. Tons.	Year. Tons.
Abbott & Co., Jere		6,522
American Screw Co		858
Bacon & Co.		223
Baldwin Bros. & Co.		53
Bowker, C. F.		3
Carey & Moen	50	739
Cohn, M.		69
Dana & Co.		4,672
Downing & Co., R. F.		247
Galpin, S. A.		2,670
Heyn, A		1,735
Hugill, Chas.		41
Jacobus, E. Y.		12
Lazard Freres		695
Leng, J. S.		850
Lilienberg, N	100	350
Lundberg, Gustaf		120
Milne & Co., A		1,408
Montgomery & Co.		73
Muller, Schall & Co.		150
Naylor & Co.	40	16,938
Newton, & Shipman		2
N. Y. Barb Wire Co.		20
Page, Newell & Co.		152
Perry & Ryer		100
Pierson & Co.		31
Pilditch, F. S.		21
Prosser, Thos		132
Roebling's Sons, J. A.		1,735
Sanderson & Son		67
Sheldon & Co., G. W.		11
Walschid C. A.		15
Washburn Mfg. Co.		35
Whittemore & Co.		1,705
Wilson, J. G.		26
Wolff & Co., R. H.	162	2,122
Total	352	43,869
Corres. date 1887	2,128	101,419

Old Rails.	Week. Tons.	Year. Tons.
Baldwin Bros.		100
Bowening & Archibald.		100
Brown Bros. & Co.		668
Crossman & Bro., W. H		1,005
D., L. & W. R. R.		409
Frankfort, M.		100
Geisenheimer & Co.		100
Henderson Bros		537
Neumark & Gross		1,912
Stetson & Co., Geo. W.		230
Waltam & Co.		300
Winter & Smillie		80
Total		5,541
Corres. date 1887	2,169	130,543

Sheet Iron.	Tons.	Tons.
Bruce & Cook		53
Coddington & Co.	70	1,614
Crooks, R. & Co.		10
Newton & S.		4
Thomsen & Co., A. A.		2
Wagner, W. F		40
Whitney & Co.	10	15
Total	10	1,738
Corres. date 1887	30	1,641

Scrap-Iron.	Tons.	Tons.
Boothby, J. H	80	80
Bowring & Archibald		200
Brown Bros. & Co.		20
Burgess & Co.		172
Crossman, W. H. & Co.		47
Frothingham, Baylis & Co.	248	248
Geisenheimer & Co.		565
Gerhardt, P. T.		8
Johnson, L. & Co.		85
Muller, Schall & Co.		15
Neumark & Gross		321
Purdon & W.		75
Salter & L.		
Trowbridge & Co., D.		75
Ward & Co., J. E.		150
Total	248	1,951
Corres. date 1887	780	15,599

Charcoal Iron.	Tons.	Tons.
Abbott & Co., Jere		3
Bacon & Co.		102
Downing & Co.		25
Lillenberg, N.		15
Luuberg, G.		16
Mersick & Co.		7
Milne & Co.		18
Muller, Schall & Co.		124
Naylor & Co.		587
Page, Newell & Co.	56	363
Sanderson & Son		1
Total	56	1,324

Spiegeleisen.	Tons.	Tons.
Abbott & Co., Jere		205
Arkell, Jas.		78
Crocker Bros.		4,819
Dana & Co.	500	3,553
Geisenheimer & Co.	25	303
Jansen, J. A.		10,493
Naylor & Co.	10	11,379
Perkins, C. L.	900	3,343
Pierson & Co.		1,050
Post, Martin & Co.		320
Total	1,435	35,543
Corres. date 1887	4,178	97,106

Iron Ore.	Tons.	Tons.
Cormack & Co.		1,022
Danagh & G		25
De Flores, R.		7,478
Earnshaw, A.		6,013
Ennis & Co		1,721
Johnston & Co		300
Naylor & Co		3,706
Outerbridge & Co., A.E.		340
Wright, Chas. L. & Co.		1,640
Total		22,235
Corres. date 1887	3,639	50,668

EXPORTS.

Copper.	Pounds.	Pounds.
Abbott & Co	25,559	11,474,604
Amer. Metal Co	112,064	5,793,549
Becker, & Co., H.		1,250
Bridgpt. Copper Co		112,000
Copper Queen		224,034
Crooks & Co, R		1,000
Crossman & Bro.		4,000
Herold, Emil		250,000
Ismay, J. Bruce		115,000
Jones, R. W.		189,984
Ladenburg, T. & Co.		229,371
Ledoux & Co		110,276
Lewisohn Bros.		4,910,254
Lomal, F. A.		2,691,293
Mendel, S		560,000
Muller, Schall		1,105,000
Naylor & Co	70,000	462,709
Neumark & Gross		120,143
Orford Co.		574,881
Parsons & Co.		420,000
Phelps, Dodge		230,664
Pope's Sons	149,000	1,892,780
Todd & Co.		112,026
Total	356,623	31,694,822
Corres. date 1887		9,780,720

Copper Matte.		
Abbott & Co		601,145
Amer. Metal Co,		3,819,761
Kunhardt & Co.		41,652
Ledoux & Co.		469,720
Lewisohn Bros.		1,126,822
Nichols & Co.		516,783
Wilm's, Terhune		35,665,569
Total		42,241,452
Corres. date 1887.		33,486,242

Copper Ore.	
American Metal Co	524,698
Kunhardt & Co.	37,682
Mallory & Co	167,065
Stann, John H.	28,000
Total	757,445
Corres. date 1887	681,068

CURRENT PRICES.

CHEMICALS.

Acid—Acetic ..... ℔
Muriatic, 18°, ℔ 100 lbs .. 1 15@1 20
Muriatic, 20°, ℔ 100 lbs .. 1 35@1 50
Nitric, 36°, ℔ 100 lbs 5.00
Nitric, 42°, ℔ 100 lbs ..... 5.50@7.00
Oxalic ..... 6½@8
Sulphuric, 60°, ℔ 100 lbs ..... 90@95
Sulphuric, 66°, ℔ 100 lbs ..... 95@1.10
Alkali—36 p. c ..... 1.10@1.15
48 p. c ..... 1.22½@1 25
Refined, 58° ..... 1.15 @1.25
Alum—Lump, ℔ lb 1¾
Ground, ℔ lb ..... 1½@2
Lump ℔ ton, Liverpool £3
Sulphate of Alumina, ℔ ton £3 15
Aqua Ammonia—18°, ℔ lb 4¾
20°, ℔ lb 6
22°, ℔ lb ..... 6@7
26°, ℔ lb ..... 10@11
Ammonia—Sul., ℔ 100 lbs... 3.10@3 15
Carb, per lb 7¾
Muriate, per lb ..... 6½@8
Arsenic—White, powdered, ℔ lb. 3¼@4½
Red. ℔ lb ..... 5½@5¾
White, at Plymouth, ℔ ton .. £11 10
Asbestos—Am. p. ton $30
Italian, p. ton, c. i. f. L'pool ... £30@£48
Asphaltum—P. ton 13.00
Prime Cuban, ℔ lb ..... 5@6c.
Hard, ℔ ton $28.00
Trinidad, refined, ℔ ton $30.00
Barytes—Sulph., Am. prime white 16.00
Sulph., foreign, floated, p. ton 19.00
Sulph., off color, p. ton 12.50
Carb., lump, f.o.b. L'pool, ton £8 0 0
No. 1, casks, Runcorn " " £4 10 10
No 2, bags, Runcorn " " 3 15 0
Bleach—Over 35 p.c., ℔ lb. 1.85 @1.90
Borax—℔ lb 7¾
Refined at Liverpool, ℔ ton £31
Brimstone—*See Sulphur.*
Bromine—℔ lb 36
Chalk—℔ ton 3.50
Precipitated, ℔ lb. 4
China Clay—English, ℔ ton. 18.50
Southern, ℔ ton 13.50
Chrome Yellow—℔ lb ..... 15@25
Cobalt—Oxide, ℔ lb ..... 2.50@2.90
Copper—Sulph. English Wks., ton £20 10s.
Precip., Eng. Wks, unit ... fluctuating
Copperas—Common, ℔ 100 lbs. 50@57½
Best, ℔ 100 lbs 1.00
Liverpool, ℔ ton, in casks .. £1 16 1.20
Cream of Tartar—Am. 99% ... 32@32¾
Powdered, 99 p c 33½
Emery—Grain, ℔ lb 4
Flour, ℔ lb 2½
Feldspar—Ground, ℔ ton 15.00
Fuller's Earth—Lump, ℔ bbl. .90@95
Powdered, ℔ lb 2
Gypsum—Calcined, ℔ bbl. 1.25
Iodine—Resublimed 3.60
Kainit—℔ ton ..... 10 00@11.00
Kaolin—*See China Clay.*
Lead—Red, ℔ lb. 6
White, American, in oil, ℔ lb. 6½
White, English, ℔ lb 7½
Acetate, or sugar of ..... 13@13½
Lime Acetate—Amer. Brown. 1.15@1.20
" Gray. .2.25@2.30
Litharge—Powdered, ℔ lb ..... 6@6¾
English flake, ℔ lb 9
Magnesite—Greek, ℔ ton 10.00
Manganese—lump, c. i. f. L'pool. 55s.
Per unit, upper down ..... 1s. 6d.
Ground £5 10
Mercuric-Chloride—(*Corrosive Sublimate*) ℔ lb. 55
Mineral Wool—℔ lb 2
Mica—In sheets according to size, 1st quality, ℔ lb ..... 25@$6 00
Phosphate Rock—S. Carolina, per ton, o. b. Charleston 5.00
Ground, ex vessel New York. 9.50@9.75
Canadian Apatite, lump, f. o. b. at shipping port, ℔ unit 24
Phosphorus—℔ lb 65
Plumbago—Ceylon, ℔ lb. .... 4@5
American, ℔ lb ..... 5@7
London, ℔ cwt £0 15 0
Potassium—Cyanide, ℔ lb ... 39@40
Bromide, ℔ lb 37
Chlorate, ℔ lb ..... 14½@14¾
Carb. ℔ lb ..... 4.70@5.50
Caustic, ℔ lb 7½
Iodide ..... 2.70@2.75
Muriate, ℔ 100 lbs ..... 1.80@1.85
Nitrate, refined, ℔ lb 6
Bichromate, ℔ lb 10½
Sulphate, ℔ 100 lbs ..... 1.15@2.35
Yellow Prussiate, ℔ lb 19
Red Prussiate, ℔ lb 42
Pumice Stone—Select lumps, lb. 3¼
Original cks., ℔ lb 1¾
Powdered, pure, ℔ lb ..... 2¼@2½
Pyrites—Non-cupreous, p. unit, d. 5
Quartz—Ground, ℔ ton 18.00
Rotten Stone—Powdered, ℔ lb. 3¼@3½
Lump, ℔ lb ..... 6@10
Eng., powdered, ℔ ton £4
Lump, ℔ ton £5
Salt—Liverpool, ground ℔ bbl. 70
Turk's Island, ℔ bbl 25
Salt Cake—℔ 100 lbs 50
Saltpeter—Crude, ℔ lb. .... 5@5½
Refined, ℔ lb. ..... 6@8
Soda Ash—Carb., 48 % 100 lb... 1.22½@1.35
Caustic, 48 % ..... 1.22½@1.35
High test ..... 1.12½@1.15
Soda Caustic, 60% ..... 2 50 @3.00
" " 70% ..... 2.37½@2.40
" " 74-5% ..... 2.37½@2.40
Sal, English, ℔ 100 lbs ... 1.15
Sal, American, ℔ 100 lbs ... .95 @1.20
Nitrate, ℔ 100 lbs ..... 2.17½@2.20
Strontium—Nitrate ℔ lb. 10½
Sulphur—Roll, ℔ lb 1¾
Flour, ℔ lb 2
Crude Brimstone, 2s., ℔ ton. 20.00@23.00
Crude Brimstone, 3ds. ℔ ton. 19.50@21.00
Talc—Ground French, ℔ lb. 1¼
Domestic, ℔ lb 6
Domestic, ℔ ton 15 00
c. i. f. Liverpool, ℔ ton £4 50
Tannin—Pure, ℔ lb. 58
Vermillion—American, ℔ lb ... 82@85
English, ℔ lb ..... 82@85
Vitriol—(blue), Ordinary, ℔ lb .. 5½
Extra, ℔ lb ..... 6@6¾
Zinc Oxide—Am., Dry, ℔ lb 4½
American, Red Seal, ℔ lb ..... 6@6½
Paris, Red Seal, ℔ lb ..... 6¼@7
* Spot

BUILDING MATERIAL.

Bricks—Pale, per 1,000 .... 2.25@2.75
Jerseys, per 1,000 ..... 4.00@5.00
Hackensacks ..... 4.75@5.25
Up Rivers, per 1000 ..... 4. 50@5.00
Haverstraw, per 1,000 ..... 6.00@6 50
Haverstraw seconds, per 1000 4.25@5.50
Fronts, nominal.
Croton ..... 14.00@18.00
Wilmington ..... 23.00@24.00
Philadelphia ..... 24 00@ .6.00
Trenton ..... 24.00@25.00
Baltimore ..... 37.00@40.00
Building Stone—Amherst freestone, per cu. ft. ..... 95@1.00
Brownstone, per cu. ft. ..... 1.00@1.35
Belleville, N. J., red and gray rock, ℔ cu. ft. 1.00
Cornwockle red freestone, ℔ cu ft 1 00
Granite, rough ℔ cu. ft. ..... 45@1.25
Granite, Scotch ..... 1.00@1.05
Cement—Rosendale, ℔ bbl .. 90@1 00
Portland, American, ℔ bbl. 2 00
Portland, foreign, ℔ bbl. .. 2 20@2.45
Keene's coarse ..... 4 50@5.50
Keene's fine ..... 7.00@8.25
Slate—Purple and green roofing, per 100 ft ..... 5.00@6 00
Red roofing, per 100 sq ft... 15.00
Black, roofing, per 100 sq. ft. 4.00@5 00
Lime—Rockland, common ... 1.00@1 20
Rockland finishing 1.25
St John, com. and finish ..... .90
Labor—Ordinary per day .... 1.50@2 00
Masons, per day 4.00
Plasterers, per day 4.00
Carpenters, per day 3.50
Plumbers, per day 3.50
Painters, per day ..... 2.50@3.50
Stonesetters, per day ..... 3.50 @4 00
Tilelayers ..... 3.50@4.50
Bricklayers 4 00

THE RARER METALS.

Aluminum—(Metallic), per lb ... $5.00
Arsenic—Metallic, per lb 32
Barium—(Metallic), per lb 975.00
Bismuth—(Metallic), per lb 2.40
Cadmium—(Metallic), per lb ... 150 00
Calcium—(Metallic), per oz 1.50
Cœsium—(Metallic) .....
Cerium—(Metallic) per oz 160.00
Chromium—(Metallic), per lb ... 200 00
Cobalt—(Metallic), per lb 6.00
Didymium—(Metallic), per oz .. 160.00
Erbium—(Metallic), per oz 140.00
Gallium—(Metallic), per oz 3250.00
Glucinum—(Metallic) 4.50
Indium—(Metallic), per oz 158.00
Iridium—(Metallic), per lb. .. 650.00
Lanthanum—(Metallic), per oz. 175.00
Lithium—(Metallic), per oz. 160.00
Magnesium—Per lb 4.00
Manganese—Metallic, per lb... 1.10
Molybdenum—(Metallic), per oz 6.00
Nickel—(Metallic), per lb ..... .65
Niobium—(Metallic), per oz 128.00
Osmium—(Metallic), per lb 640.00
Palladium—(Metallic), per lb .. 400.00
Platinum—(Metallic), per lb ... 128.00
Potassium—Metallic, per oz ... 2.00
Rhodium—(Metallic), per lb 512.00
Ruthenium—(Metallic), per oz. 112.00
Rubidium—(Metallic), per oz. ... 200.00
Selenium—(Metallic), per oz .. 3.00
Sodium—(Metallic) per lb .. 4.50
Strontium—(Metallic), per oz .. 128 00
Tantallum—(Metallic) per oz ... 144.00
Telurium—(Metallic) per oz 9 00
Thallium—(Metallic) per oz 3.00
Titanium—(Metallic) per oz 32.00
Thorium—(Metallic) per oz. ... 272.00
Tungsten—(Metallic) per lb 1.25
Vanadium—(Metallic), per oz .. 320.00
Yttrium—(Metallic), per oz 144 00
Zirconium—(Metallic) per oz .. 240.00

METALS.

Aluminum—
Bronze (10 %), ℔ lb ..... 46c.
Copper—
Lake Ingot, Spot, ℔ lb ... 17·50c
Electrolytic, ℔ lb ..... 16·50c
Casting Brands, ℔ lb. ... 16c.
Chili Bars, London, ℔ ton £84
Sheet Copper (according to size), ℔ lb ..... 25 @38c
Lead—
Domestic, Common, Spot .. 4 90c.
Foreign ..... 5 50c.
Sheet, ℔ lb, net ..... 7·00@7¼c net
Pipe, ℔ lb ..... 6½c. "
Tin lined Pipe, ℔ lb ..... 15c. "
Shot, ℔ lb 7¼c
Tin—
Tin Plates ..... 14s. 9d.
Tin Spot in London ..... £100 10s.
Pig tin, spot in N. Y., ℔ lb .. 23.20c.
Zinc—
Domestic spelter, ℔ lb .... 5·10c.
Foreign spelter, ℔ lb ... 5¾c.
Silesian, ton £19
Sheet, American, ℔ lb .... 6¾c.
Antimony—Hallet's, per lb .. 10½c.
Cookson's, per lb 14c
Star Antimony £42 10s*
Quicksilver—Per lb ..... 61@63c.
London, ℔ flask ..... £7@£7¼

IRON AND STEEL.
New York Prices.

American Pig-Iron.—At tidewater.
No. 1 X ..... $18.00@$18.50
No. 2 X ..... 17.00@ 17.50
Forge ..... 16.00@ ....
Scotch Pig—Coltness ... 21.75@ 22 00
Clyde ..... @ 20.50
Dalmellington ..... @ 20.50
Summerlee ..... 22.00@ 22.25
Shotts ..... 21.00@ 21.50
Langloan ..... 21.00@ 21.50
By Cable to day to the Metal Exchange:
Scotch Warrants ..... 40s. 9d.
Coltness, at Glasgow ..... 49s 6d.
Langloan, at Glasgow ..... 49s. 0d.
Summerlee, at Glasgow ..... 52s. 0d.
Gartsherrie, at Glasgow ..... 47s. 6d.
Glengarnock, at Aidrossan .... 47s 6d.
Dalmellington, at Ardrossan .... 42s. 6d.
Eglinton, at Ardrossan ..... 41s. 6d.
Bessemer Pig—
Foreign, nominally ..... $19.50@$20.00
Domestic ..... 16@18.25
Spiegeleisen—
German, 20 per cent. .. $26.00@$26.50
English, 20 " " ..... 27.00@ 27.50
" 30 " " ..... 31.50@ 32.00
Ferro Manganese, 80% ..... 55.00@ .....
Steel Blooms, nominally .....
Steel Billets, " ..... @ .....
Steel Nail Slabs, " ..... @ .....
Steel Wire Rods, " 39.75@ 40.00
Steel Rails—
Heavy sections, at mill .... $28.00@ 28.50
Light " " " 30.00@ 34 00
Structural Iron and Steel—
Bridge Plate, at mill ..... 2·0 @2·1c.
Angles, at mill ..... 2·00@2·10c.
Tees, at mill ..... 2 40@2 50c.
Steel Angles, at mill ..... 2¼ @2½c.
Beams and channels, on wharf, 3·5c. base
Steel Plates—
Tank and Ship, on wharf ..... 2 25@2·4
Shell, on wharf ..... 2·4 @2·6
Flange, " ..... 3¾ @3
Fire-Box, on wharf ..... 3¼ @3½
Iron Plates—
Common tank, on wharf 2·1@2·2c.
Refined, on wharf .. .. 2·3@2 4c.
Shell, " ..... 2·4@2½c.
Flange " ..... 3·4@3·5
Extra flange, on flange .. 3¾@4
Bar Iron—
Refined ..... 1·7 @1·9c.
Common ..... 1·55@1 65c.
Merchant Steel—
American tool ..... 8½@10c.
Special grades ..... 13 @20c.
Crucible machinery ..... 5 @6c
" spring 4½c
Bessemer machinery ..... 2·2@ .5c
" spring ..... 2·7@2·9c.
Cast-Iron Pipe—At works:
According to size ..... $25 00@$31.00
Wrought Iron Pipe—nominally—
Butt-Welded, Plain and Tarred, 52½% disc; Galv., 45% disc.
Lap-Welded, Plain and Tarred, 62½% disc; Galv., 52½% disc.
Boiler Tubes—Per cent disc. .60@62½%
Rail Fastenings—
Spikes ..... 2·2@2·25c. delv'd
Angle Fish-bars ..... 1·9 @2c.
Bolts and Sq Nuts ..... 2·9 @3c
" Hex " ..... 3·1 @
Wrought Scrap—
Foreign, *ex store* ..... @
No. 1 Yard *to vessel* ..... 20.50@ 21.00
Cast Scrap ..... 15.50@ 16.50
Old Car Wheels ..... @
Old Rails—Tees ..... 23.00@ 24.00
—Doubles ..... 24.00@ 25.00
Nails—In car-load lots. .. 1 85@1·90c.
—From store ..... 1·95@ 2.00

Louisville Prices.

Hot Blast Irons—
So. Coke, No. 1 ..... $17.50@$18.00
" " No. 2 ..... 16 50@ 17.00
" " No. 2½ ..... 16.00@ 16.50
Mahoning Valley (Lake Ore Mixture) ..... 20.50@ 21.00
So. Charcoal, No. 1 ..... 18.00@ 18.50
" " No. 2 ..... 17.00@ 17.50
Missouri Charcoal No. 1 ... 19.50@ 20.00
" " No. 2 ..... 19.00@ 19.50
Forge Irons—
Neutral Coke ..... $14.75@$15.25
Cold Short ..... 14.25@ 14.75
Mottled ..... 12.75@ 13.75
Car Wheel and Malleable Irons—
Southern (standard brands) $22.00@$25 00
" (other brands) ..... 18 00@ 18 50
Lake Superior ..... 21.50@ 22.50

Pittsburg Prices.

Coke or Bituminous Pig—
Foundry No 1 ..... $17.50@18.00
Foundry No. 2 ..... 16.75@17.00
Gray Forge No. 3 ..... 16.25@16.50
" " No. 4 ..... 15.25@15.50
White ..... @15.00
Mottled ..... 15.00@15 50
Silvery ..... 16.50@18.50
Bessemer ..... 17.75@18.00
Low Phos ..... 22.00@22.50 cash
Charcoal Pig—
Foundry No. 1 ..... 23.50@24.50
Foundry No. 2 ..... 22.00@24.00
Cold-Blast ..... 25.00@27.00
Warm-Blast ..... 24.00@25.00
20 p. c. Spiegel ..... @28 00
Muck-Bar ..... 29.00@29.50
Steel Blooms ..... 29.00@29 25
Steel Slabs ..... 29 00@29 25
Steel Crop Ends ..... 19.50@20.00
Steel Bloom Ends ..... @19.50
Ferro Manganese, 80% ..... 56.00@56.50
Steel Billets ..... 29.00@29.50
Old Iron Rails ..... 25 00@25.25
Old Steel Rails ..... 19.00@20 00
No. 1 W. Scrap ..... 19.50@20.00
No. 2 W. Scrap ..... 18.00@18.50
Steel Rails ..... *30.00@ .....
" light sections ..... *32.00@33.00
Bar Iron, nominal ..... 1 75@ 1.80
Nails ..... $2.00 usual discount
Steel Nails $2.50
Two per cent off for cash. * At works.

Philadelphia Prices.

Foundry No. 1 ..... $18.00@19.00
Foundry No. 2 ..... 17.00@18 00
Gray Forge ..... 15.50@16.50
Bessemer Pig ..... 19.50@20.50
Steel Rail Blooms ..... 29.50 nom
Foreign Bessemer ..... 19.50@20 50
Spiegeleisen ..... 26.50@27.00
Scrap, Selected ..... 22.00@23.00
No. 1 ..... 21.00@20.00
Carro Scrap ..... 21.00@21.50
Muck-Bars ..... 29.00@30.00
Merchant Iron ..... 1.75@ 1.90
Plate Iron ..... 2.00@ 2.10
Tank Iron ..... 2.00@ 2.15
Skelp Iron ..... 1.80@ 1.95
Angles ..... 2.00@ 2.10
Beams and Channels ..... 3.30.@ ..
Nails ..... 1 90@ 2.00
Steel Rails ..... 28@29.50
Old Rails ..... 23.00@24.00

STOCK MARKET QUOTATIONS.

Baltimore, Md.

COMPANY.	Bid.	Asked.
Atlantic Coal....	1.40	....
Balt. & N. C....	.23@ .31	.30@ .50
Conrad Hill.....	....	.12@ .15
Diamond Tun..	.35	....
George's Crk. C.	102.00	103.25
Lake Chrome..	.05@ .06	.10
N. State, Balto..	.20@ .25	.30
Ore Knob.....	.05@ .09	.10@ .15
Silver Valley....	.80@ .85	1.00

Highest and lowest prices bid and asked during the week ending October 11th.

Birmingham, Ala.

COMPANY.	Bid.	Asked.
Ala. Conn. C..	....	25
Bir. Min. & Mfg.	....	155 @165
Bir. Fur. & Mg.	4	16¼@ 19
Broken Arrow C. & M.. ..	....	12¾
Decat. L. Imp. & Fur	11 @11½	11¼@ 12½
DecaturMin. L.	23	.
Enterprise Mfg. Co	....	50
Jagger-Townley C & C. Co.	....	11
Mag-Ellen C. & Mg	67½@70	...
No. Bus. Crk., C. & Mg	3¾@ 4	4¼@ 7½
Sloss I. & S....	20 @21½	23
* Sloss I. & S..	77	...
Sheffield C. & I.	..	77¾@ 74
Tenn. C. & I. Co.	29	31 @ 32
*Williamson Iron Co..	99¾	....
Woodstock S. & I	52	59

* Bonds.

Highest and lowest prices bid and asked during the week ending October 9th.

Pittsburg, Pa.

COMPANY.	H.	L.	Closing.
Bridgewater Gas.	50.00	50.00	50.00
Chartiers Val. Gas.	55.00	50.00	50.00
Columbia Oil Co..	4.50	4.25	4.50
La Noria Mining ..	2.00	1.50	2.00
Lustre Mining	2 00	1.75	1 25
M'f'turers' Gas....	25 00	25.00	25.00
N. Y. & C. Gas Coal.	35.00	30.00	35.00
Ohio Valley Gas ..	37.50	34.75	34.75
Philadelphia Co..	40.88	40.00	40.63
Westinghouse Air Brake	64.00	64.00	64.00
Westinghouse Brk. Co., Ltd	64 00	64.00	64.00

Highest and lowest prices bid and asked during the week ending October 10th

Foreign Quotations.

London, September 29.

COMPANY.	Highest.	Lowest
Alturas Gold, Idaho...	9s.	8s.
Arizona Copper, Ariz..	18s. 6d.	18s.
Birdseye Creek, Cal. ..	6s.	5s.
Carlisle, N. Mex	12s.	11s.
Colorado United, Colo..	5s.	3s.
Columbian, S A	35s.	32s. 6d.
Cons. Esmeralda, Nev..	7s.	6s.
Denver Gold, Colo.....	2s.	1s.
Dickens Custer, Idaho.	9s.	8s.
Eberhardt, Nev	1s.	6d.
El Callao, Venezuela....	£2¾	£2¼
Empire, Mont	12s. 6d.	10s.
Flagstaff, Utah.....	5s.	4s.
Garfield, Nev.....	17s. 6d.	15s.
Gold Hill, N. C.....	2s 6d.	1s. 6d.
Ilex, Cal.....	£7/6	£2¾
Josephine, Cal.....	7s. 6d.	5s.
Kohinoor, Colo.....	3s. 6d.	2s. 6d.
Mason & Barry, Portugal	£12⅞	£12⅝
Montana Lt., Mont	£1¾	£1⅝
New California, Colo...	8s.	7s 6d.
New Emma, S., Utah..	6s.	5s
New Hoover Hill, N. C.	2s. 6d.	1s. 6d.
New La Plata, Colo...	2s. 6d.	1s 6d.
Pittsburg Cons., Nev...	£1	17s. 6d.
Quebrada, Venezuela...	£6	£5¾
Richmond Con., Nev...	£3¼	£3
Ruby & Dunderberg, Nev	3s.	2s.
Russell Gold, N. C.....	4s. 6d.	3s. 6d.
Sierra Buttes, Cal....	£⅝	£¼
Stanly, N. C.....	7s.	5s.
Tolima, Colombia, S.A.	£2¼	£1¾
U. S. Placer, Colo.....	10s.	7s. 6d.
Viola Lt., Idaho	20s.	17s. 6d.

Paris.* September 20.

El Callao.....	63	61
Golden River	405	405
Lexington.....	95	95
" parts	4.50	4 50
Rio Tinto.....	626 25	626.25
" obligations...	516.25	516.25
" " 2d.	507.50	507.50
Tharsis	169.00	169.00

* Francs.

DIVIDEND-PAYING MINES.

	Name and Location of Company.	Capital Stock.	Shares. No.	Shares. Par	Assessments. Total levied.	Assessments. Date and amount of last.		Dividends. Total paid.	Dividends. Date and amount of last.		
1	Adams, s. L..	Colo.	$1,500,000	150,000	$10	*	.....	.....	$555,000	Jan.	1887 .15
2	Alice, s. C .	Mont	10,000,000	400,000	25	*	.....	.....	750,000	Sept	1886 .06¼
3	Alturas, g ..	Idah.	1,500,000	300,000	5	.....	.....	.....	95,000	Sept	1886 .50
4	Amy & Silversmith, s.	Mon.	.....	341,419	...	.....	.....	.....	247,530	Aug.	1887 .12½
5	Atlantic, C.....	Mich	1,000,000	40,000	25	$280,000	Apl. 1875	$1.00	480,000	Aug.	1888 1.50
6	Argenta, s.....	Nev..	10,000,000	100,000	100	325,000	July 1885	.10	40,000	Feb.	1890 .20
7	Aurora, I..... ..	Mich	2,000,000	100,000	20	.....	.....	.....	155,000	Oct.	1887 1.87½
8	Bassick, G. S..... ..	Colo.	10,000,000	100,000	100	.....	.....	.....	400,000	Mar.	1884 1.00
9	Belle Isle, s.....	Nev..	10,000,000	100,000	100	145,000	Feb 1887	.20	300,000	Dec.	1879 .25
10	Belcher, G. s.....	Nev..	10,400,000	104,000	100	2,770,000	Sept 1888	.50	15,397,200	Apl.	1876 1.00
11	Bellevue Idaho S. L.	Idah.	1,250,000	125,000	10	57,500	Nov. 1887	.25	187,500	Jan	1887 .10
12	Black Bear, G.....	Cal..	3,000,000	30,000	100	22,500	Dec. 1884	.25	895,000	May	1883 .20
13	Bodie Con., G. s.....	Cal..	10,000,000	100,000	100	500,000	Sept 1888	.50	1,295,000	Apl.	1885 .50
14	Bonanza Developm't	C & M	3,000,000	300,000	10	.....	.....	.....	135,000	Oct.	1882 .15
15	Bonanza K'g, Cons. s.	Cal..	1,000,000	100,000	10	*	.....	.....	185,000	Feb.	1885 .10
16	Boston & Mont, G.....	Mon	2,500,000	250,000	10	*	.....	.....	520,000	Jun.	1886 .50
17	Boston & Mont... G. S.	Mon	2,500,000	250,000	25	*	.....	.....	400,000	Nov.	1888 2.00
18	Breece, s.....	Colo.	,000,000	200,000	25	*	.....	.....	2,000	Feb.	1880 .01
19	Brooklyn Lead, L. s.	Utah	500,000	50,000	10	.....	.....	.....	127,000	July	1887 .05
20	Bulwer, G.....	Cal..	10,000,000	100,000	10	80,000	May 1888	.20	175,000	Jan.	1884 .10
21	Caledonia, G.....	Dak.	10,000,000	100,000	100	505,000	May 1885	.15	40,000	Feb.	1886 .10
22	Calumet & Hecla, C..	Mich	2,500,000	100,000	25	1,200,000	..	.....	30,850,000	Sept	1888 5.00
23	Carbonate Hill, s. L.	Colo.	2,000,000	200,000	10	*	...	.....	80,000	Apl.	1884 .05
24	Caribou Con., s.....	Colo.	1,500,000	150,000	10	*	.....	.....	60,000	Mch	1880 .10
25	Castle Creek, G.....	Idah.	100,000	100,000	1	.....	.....	.....	51,000	Oct..	1883 .03
26	Catalpa, s. L.....	Colo.	3,000,000	300,000	10	*	.....	.....	270,000	May.	1884 .10
27	Central, C.....	Mich	500,000	20,000	25	100,000	Sept 1861	.06	1,890,000	Aug.	1888 1.50
28	Christy, s.....	Utah	10,000,000	100,000	100	.....	.....	.....	10,000	Jun.	1886 .10
29	Chrysolite, G. L.....	Colo.	10,000,000	200,000	50	*	.....	.....	1,650,000	Dec.	1884 .25
30	Colorado Central, s. L	Colo.	2,750,000	275,000	10	*	.....	.....	337,500	Oct.	1888 .05
31	Confidence, s. L.....	Nev..	.....	24,980	...	287,440	Apl. 1887	.50	174,720	Aug.	1888 1.00
32	Cons. Cal. & Va., G. s.	Nev.	21 600 000	216.000	100	108,000	Jan. 1885	.20	2,332,800	Oct.	1888 .50
33	Contention, s.....	Ariz.	12,500,000	250,000	50	...	.....	.....	†2,587,000	Dec.	1884 .25
34	**Cop. Queen Cons, C.	Ariz.	1,400 000	140.000	10	.....	.....	.....	140,000	Oct.	1888 .50
35	Crescent, S. L. G. ...	Utah	15,000,000	600,000	25	*	.....	.....	210,000	Aug.	1886 .05
36	Crown Point, G. S.. .	Nev..	10,000,000	100,000	100	2,825,000	Oct. 1888	.50	11,584,000	Jan.	1876 2.00
37	Daly, S. L.....	Utah	3,000,000	150,000	20	.....	.....	.....	750,000	Sept	1888 .25
38	Deadwood-Terra, G..	Dak..	5,000,000	200,000	25	*	.....	.....	‡1,000,000	Nov.	1887 .10
39	Derbec B. Grav., G. s.	Cal..	10,000,000	100,000	100	90,000	Dec. 1881	.10	180,000	May	1887 .10
40	Dunkin, s. L.....	Colo.	5,000,000	200 000	25	*	.. ..	.....	345,000	Oct.	1888 .05
41	Eclipse.....	Colo.	100,000	100,000	1	.....	.....	.....	20,000	Nov.	1887 .10
42	Elknorn, G. s.....	Mont	1,000,000	100,000	10	50,0 0	July 1883	.50	170,000	July	1887 .05
43	Empire L., G.....	Mont	500,000	100,000	5	.....	.....	.....	70,500	Oct.	1887 .37½
44	Eureka Con., G. s. L.	Nev..	5,000,000	50,000	100	600,000	July 1886	1.00	4,918,500	July	1888 .25
45	Evening Star, s. L....	Colo.	500,000	30,000	10	.....	.....	.....	1,400,000	Nov.	1883 .50
46	Excelsior, G.....	Cal..	10,000,000	100,000	100	560,000	Sept 1885	1.00	875,000	Oct..	1880 .25
47	Father de Smet, G.. .	Dak..	10,000,000	100 000	100	200,000	Nov 1878	1.00	1,125,000	Dec.	1885 .20
48	Franklin, C.....	Mich	1,000,000	40,000	25	220,000	Jun. 1871	.....	720,000	July	1888 2.00
49	Freeland, G. s. C.....	Colo.	5,000,000	200,000	25	*	.....	.....	190,000	July	1886 .10
50	Fresno Enterprise, G	Cal..	5,000,000	100,000	50	.....	Mch 1883	.10	110,000	July	1882 .10
51	Garfield Lt., G. s....	Nev.	500,000	100,000	5	.....	.....	.....	85,000	Apl.	1888 .12½
52	Golconda, G. s.....	Idah.	1,000,000	100,000	10	.....	.....	.....	120,000	May	1888 .60
53	Gould & Curry, G. s.	Nev..	10,800,000	108,000	100	5,355,000	Oct. 1888	.50	3,826,800	Oct.	1870 10.00
54	Grand Central, s.....	Ariz.	1,000,000	100,000	10	.....	.....	.....	625,000	Dec.	1882 .25
55	Grand Prize, s..... .	Nev..	10,000,000	100,000	100	570,000	Apl. 1886	.50	495,000	Mar.	1884 .25
56	Granite, s.....	Colo.	125,000	125,000	...	.....	.....	.....	6,250	May	1883 .01
57	Granite Mountain, s.	Mont	10,000,000	400,000	25	.....	.....	.....	4,700,000	Oct.	1888 .50
58	Green Mountain, G...	Cal..	1,250,000	125,000	10	*	.....	.....	212,000	Nov.	1881 .07½
59	Hale & Norcross, G. s	Nev..	11,200,000	112,000	100	5,086,000	July 1887	.50	1,822,000	Aug.	1888 .50
60	Hall-Anderson, G....	N. S..	150,000	150,000	1	.....	.....	.....	7,000	Jan.	1882 .05
61	Hecla Con., s. G. L. C.	Mont	1,500,000	30,000	50	.....	.....	.....	1,197,500	Aug.	1888 .50
62	Hel'a Mg & Red, G. s. L	Mont	3,315,000	663,000	5	*	.....	.....	197,973	July	1886 .06
63	Holmes, s.....	Nev..	10,000,000	100,000	9	300,000	Sept 1885	.10	75,000	Apl.	1886 .25
64	Holyoke, G.....	Idah.	200,000	200,000	1	.....	.....	.....	27 000	Feb.	1883 .10
65	Homestake, G.....	Dak.	12,508,000	125,000	100	200,000	July 1878	1.00	4,218,750	Sept	1888 .20
66	Honorine, s. L.....	Utah	500,000	250,000	2	25,000	Jun. 1883	.....	125,000	Sept	1887 .05
67	Hope, s.....	Mont	1,000,000	100,000	10	*	.....	.....	233,252	Apl.	1888 .25
68	Horn-Silver, s. L....	Utah	10,000,000	400,000	25	*	.....	.....	4,000,000	Nov.	1884 .50
69	Hubert, G.....	Colo.	500,000	50,000	10	*	.....	.....	239,500	Oct.	1888 .11
70	Idaho, G.....	Cal..	310,000	3,100	100	.....	.....	.....	4,966,750	Sept	1888 7.50
71	Ideal, S. L.....	Colo.	1,500,000	50,000	10	.....	.....	.....	15,000	Oct.	1886 .05
72	Illinois, s...	N. M.	100,000	100,000	1	.....	.....	.....	25,000	Jan.	1887 .25
73	Independence, s.....	Nev..	10,000,000	100,000	100	340,000	Oct.. 1886	.20	225,000	Sept	1879 .25
74	Indian Queen, s.....	Nev..	250,000	125,000	2	.....	.....	.....	368,750	July	1883 .03
75	Iron Hill, s..... ..	Dak.	2,500,000	250,000	10	118,750	Sept 1888	.03	156,250	Nov.	1887 .07½
76	Iron-Silver, s. L	Colo.	10,000,000	500,000	20	.....	.....	.....	2,300,000	July	1888 .20
77	Jackson, G. s.....	Nev.	5,000,000	50,000	100	10,000	Nov 1880	.20	45,000	Oct.	1880 .10
78	Jay Gould.....	Mont	2,000,000	400,000	5	*	.....	.....	240,000	Jun.	1888 .09
79	Jocusitita, s.....	Mex.	2,500,000	250,000	10	.....	.....	.....	1,200,000	Feb.	1885 .50
80	Jumbo, G.....	Colo.	2,000,000	200,000	10	.....	.....	.....	35,000	Oct.	1887 .02½
81	Kentuck.....	Nev..	3,000,000	30,000	100	342,000	Nov 1881	.30	1,350,000	Dec.	1886 .10
82	La Plata, s. L..... ...	Colo.	2,000,000	200,000	10	*	.....	.....	610,000	Sept	1882 .30
83	Leadville Cons., s. L.	Colo.	4,000,000	400,000	10	*	.....	.....	423,000	Apl.	1887 .05
84	Lexington, G. s.....	Colo.	1,000,000	100,000	10	*	.....	.....	565,000	Feb.	1885 2.00
85	Little Chief, s. L....	Colo.	10,000,000	200,000	50	*	.....	.....	880,000	July	1888 .10
86	Little Pittsburg, s. L	Colo.	20,000,000	200,000	100	*	.....	.....	1,050,000	Mch	1880 .50
87	Manhattan, s.....	Nev	5,000,000	50,000	100	250,000	Dec. 1887	1.00	437,500	Feb	1886 .25
88	Marion Bullion, G ..	N. C.	500,000	.....	...	.....	.....	.....	15,000	Jan.	1886 .....
89	Martin White, s.....	Nev..	10,000,000	100,000	100	1,150,000	Mar. 1886	.25	140,000	Dec.	1886 .25
90	Mary Murphy, G. s....	Colo.	350,000	3,500	100	*	.....	.....	122,500	Oct.	1888 5.00
91	Minnesota, C.....	Mich	1,000,000	40,000	25	420,000	Apl. 1886	1 00	1,826,000	Mar.	1886 .....
92	Mono, G.....	Cal.	5,000,000	50,000	100	641,000	Sept 1888	.50	12,500	Mar.	1886 .25
93	Montana, Lt., G. s....	Mont	3,300,000	660,000	5	*	.....	.....	2,149,035	Oct.	1888 .06¼
94	Morning Star, s. L....	Colo.	1,000,000	100,000	10	.....	.....	.....	775,000	Mar.	1888 .25
95	Moulton, s. G.....	Mont	2,000,000	400,000	5	*	.....	.....	380,000	Dec.	1887 .07½
96	Mount Pleasant, G....	Cal.	150,000	150,000	1	*	.....	.....	150,000	Feb.	1887 .30
97	Mt. Diablo, s.....	Nev.	5,000,000	50,000	100	137,500	Jun. 1880	2.00	120,000	Aug.	1888 .20
98	Napa, Q.....	Nev..	1,000,000	100,000	10	*	.....	.....	290,000	Jan.	1885 .10
99	Navajo, G. s.....	Nev..	10,000,000	100,000	100	435,000	Apl. 1888	.30	325,000	Feb.	1885 .25
100	N. Hoover Hill, G. s..	N. C.	300,000	120,000	2½	*	.....	.....	30,000	Dec.	1885 .06¼
101	Northern Belle, s....	Nev..	5,000,000	50,000	100	425,000	Jan. 1884	5.00	2,400,000	Apl.	1883 .50
102	North Belle Isle, s.. .	Nev..	10,000,000	100,000	100	250,000	Mar. 1887	.50	230,000	May	1883 .50
103	Ontario, s. L.....	Utah	15,000,000	150,000	100	.....	.....	.....	9,500,000	ept	1888 .50
104	Ophir, G.....	Nev..	10,000,000	100,000	100	4,109,440	Sept 1888	.50	1,595,500	July	1882 1.00
105	Original, G. S. C.....	Mont.	1,500,000	60,000	25	*	.....	.....	60,000	Apl.	1888 .50
106	Osceola, C.....	Mich	1,250,000	50,000	25	480,000	Apl. 1876	1.60	1,173,500	Sept	1888 1 00
107	Oxford, G.....	N. S.	125,000	125,000	1	*	.....	.....	33,500	Oct.	1885 .02
108	Paradise Valley, G. s	Nev.	10,000,000	100,000	100	62,000	Apl. 1888	.15	150,000	Apl.	1887 .10
109	Parrott, C.....	Mont	1,800,000	180,000	10	.....	.....	.....	246,000	Oct.	1888 .20
110	Peacock, s. G. C.....	N. M.	2,000,000	200,000	10	*	.....	.....	60,000	Nov.	1886 .....
111	Pleasant Valley, G. s.	Cal..	10,000,000	100,000	100	10,000	Mar. 1884	.10	30,000	Dec.	1882 .05
112	Plutus, G. S. C.....	Colo.	2,000,000	200,000	10	*	.....	.....	120,000	Dec.	1886 .10
113	Plymouth Con., G....	Cal..	5,000,000	100,000	50	*	.....	.....	2,280,000	Feb.	1888 .40
114	Prussian, s. L.....	Colo.	1,500,000	150,000	10	.....	.....	.....	132 000	Jan.	1883 .10
115	Quicksilver, pref., Q.	Cal..	4,300,000	43,000	100	.....	.....	.....	1,471,442	Oct.	1888 1.25
116	" com., Q.	Cal..	5,700,000	57,000	100	.....	.....	.....	451,000	July	1882 .40
117	Quincy, C....	Mich	1,000,000	40,000	25	200,000	Dec. 1862	.....	4,970,000	Aug.	1888 5.00
118	Richmond, s. L.....	Nev..	1,350,000	54,000	25	*	.....	.....	4,312,587	Jun.	1887 1.25
119	Ridge, G.....	Mich.	500,000	200,000	25	219,939	Mar 1886	.50	90,750	Dec.	1886 .50
120	Rising Sun, s.	Dak..	750,000	150,000	...	*	.....	.....	52,000	May	1881 .07½
121	Robinson Con., s. L..	Colo.	10,000,000	200,000	50	*	.....	.....	585,000	Mar.	1886 .05
122	Robert E. Lee, s. L...	Colo	10,000,000	500,000	20	.....	.....	.....	100,000	Dec.	1882 .50
123	Rooks, G.....	Vt...	500,000	50,000	10	*	.....	.....	61,000	Apr	1885 .50
124	Savage, s.....	Nev..	11,200,000	112,000	100	6,436,000	Oct. 1888	.50	4,460,000	July	1869 3.00
125	Security L. Mg., Mfg.	Colo.	1,000,000	100,000	10	*	.....	.....	50,000	July	1884 .....
126	Shoshone, G.....	Idah.	150,000	150,000	1	.....	.....	.....	7,000	Nov	1883 .01
127	Sierra Buttes, G.....	Cal..	2,225 000	122,500	10	.....	.....	.....	1,492,557	Apl.	1888 .12½
128	Sierra Nevada, G. s..	Nev..	10,000,000	100,000	100	6,125,000	July 1888	.25	102,000	Jan.	1871 1.00
129	Sierra Nevada, s. L..	Idaho	1,000,000	¶	1	*	.....	.....	20,000	June	1888 .01
130	Silver Cord, G. s. L..	Colo.	5,000,000	500,000	10	.....	.....	.....	225,000	Nov.	1883 .25
131	Silver King, s.....	Ariz.	10,000,000	100,000	100	50,000	Jun. 1888	.50	1,950,000	July	1887 .25
132	Silver Mg. of L. V....	N. M.	500,000	500,000	1	.....	.....	.....	25,000	June	1888 .05
133	Silverton, G. s. L....	Colo.	2,000,000	200,000	10	*	.....	.....	80,000	Nov.	1886 .02
134	Small Hopes Cons., s.	Colo.	5,000,000	250,000	20	*	.....	.....	3,112,500	Dec.	1887 .20
135	Smuggler, s. L.....	Colo.	600,000	60,000	10	.....	.....	.....	66,700	Aug.	1883 .25
136	Spring Valley, G.....	Cal..	200,000	200,000	1	50,000	Oct. 1886	.25	50,000	Jan	1881 .25
137	Standard, G. s.....	Cal..	10 000,000	100,000	100	25,000	Oct. 1884	.25	8,595,000	Jun.	1888 .05
138	Stormont, s	Utah	500,000	500,000	1	*	.....	.....	155,000	Nov	1881 .05
139	St. Joseph, L.....	Mo..	1,500,000	150,000	10	*	.....	.....	844,000	Dec	1887 .20
140	Surinam, G..... ..	D. G.	3,000,000	300,000	10	*	.....	.....	105,000	Nov	1887 .05
141	Swanson, G.....	Colo.	600,000	60,000	10	.....	.....	.....	9,000	Apl.	1888 .02½
142	Syndicate, G.....	Cal..	10,000,000	100,000	100	38,729	July 1882	.15	43,308	Sept	1885 .10
143	Tamarack, C.....	Mich.	1,000,000	40,000	25	520,000	Apl. 1885	3.00	440,000	Oct.	1888 5.00
144	Tip Top, s	Ariz.	10,000,000	100,000	100	250,000	Sept 1883	.25	100,000	Nov.	1881 .20
145	Tombstone, G. s. L...	Ariz.	12,500,000	500,000	25	*	.....	.....	1,250,000	Apl	1882 .10
146	United Verde, C.....	Ariz.	3,000,000	300,000	10	*	.....	.....	97,500	Feb.	1884 .20
147	Valencia, M.....	N. H.	150,000	1,500	100	*	.....	.....	37,500	Apl	1886 2.50½
148	Viola Lt., s. L.....	Idah.	750,000	150,000	5	*	.....	.....	222,500	Dec.	1887 .12
149	Yankee Girl	Colo.	2,500,000	250,000	10	*	.....	.....	1,275,000	July	1887 .10
150	Yellow Jacket, G. s.	Nev..	12,000,000	120,000	100	5,448,000	Dec 1885	.75	2,184,000	Aug	1871 1.50

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.	Capital Stock.	Shares. No.	Shares. Par Value.	Assessments. Total levied.	Assessments. Date & am't of last.	
1	Agassiz Cons., s. L..	Colo.	$2,500,000	50,000	$50	.....	.....
2	Allouez, C.....	Mich	2,000,000	80,000	25	$657,000	Jun 1888 1.00
3	Alpha Con., G. s....	Nev..	5,000,000	30,000	100	536,250	Jan. 1888 37½
4	Alta, s.....	Nev..	10,080,000	100,800	100	2,241,600	Sept 1888 .60
5	Amador, G.....	Cal..	400,000	200,000	2	*	....
6	American Flag, s...	Colo.	1,250,000	125,000	10	300,000	Jun 1877 .50
7	Anglo-Montana, Lt.,	Mon.	600,000	120,000	5	.....	....
8	Appalachian, Lt., G.	N. C.	1,500,000	300,000	5	.....	....
9	Aspen Mg. & S., s. L.	Colo.	2,000,000	200,000	10	.....	....
10	Barcelona, G.....	Nev..	5,000,000	200,000	25	*	....
11	Bechtel Con. G.....	Nev..	10,000,000	100,000	100	173,500	Jan. 1883 .10
12	Belmont, s.....	Nev..	5,000,000	50,000	100	735,000	Apl. 1886 .10
13	Best & Belcher, G. s.	Nev..	10,080,000	100,800	100	2,029,390	Jun. 1888 .25
14	Big Pittsburg, s. L...	Colo.	20,000,000	200,000	100	*	....
15	Bi-Metallic, s.....	Mon.	5,000,000	200,000	25	*	....
16	Black Oak, G.....	Cal..	3,000,000	300,000	10	*	....
17	Boston Con., G.....	Cal..	13,000,000	100,000	100	170,000	Nov 1883 .25
18	Bremen, s.....	N. M.	5,000,000	500,000	10	*	....
19	Brunswick, G..... ..	Cal..	2,000 000	400,000	5	*	....
20	Bullion, G. s.....	Nev..	10,000,000	100,000	100	4,007,000	Aug. 1888 .50
21	Bye and Bye.....	Ariz.	1,000,000	100,000	10	*	....
22	Calaveras, G..... ..	Cal..	500,000	500,000	1	*	....
23	Carisa, G.....	Wy .	500,000	100,000	5	*	....
24	Carupano, G. S. L. C.	Ven.	200,000	100,000	2	*	....
25	Cashier, G. s.....	Colo.	500,000	250,000	2	*	....
26	Cen. Contin't, G. s. L.	C. & A	2,000,000	200,000	10	*	....
27	Charles Dickens, G. s.	Idah.	1,250,000	250,000	5	*	....
28	Cherokee, G.....	Cal..	1,500,000	150,000	10	.....	....
29	Chollar, S.....	Nev..	11,200,000	112,000	100	1,320,000	Oct. 1888 .50
30	Cinnamon Mt., G. s..	Colo.	750,000	150,000	5	.....	....
31	Cleveland, T.....	Dak.	1,000,000	500,000	2	.....	....
32	Comstock, G. s.....	Nev..	10,000,000	100,000	100	30 000	Mar. 1887 .15
33	Con. Imperial, G. s.	Nev..	5,000,000	50,000	100	1,175,000	Sept 1887 .25
34	Con. Pacific, G.. ...	Cal..	6,000,000	60,000	100	177,000	Sept 1887 .10
35	Cons. Silver, s.....	Mo...	2,500,000	250,000	10	.....	....
36	Courtland, s.....	Colo.	500,000	50,000	10	.....	....
37	Crescent, s. L.....	Colo.	3,000,000	300,000	10	*	....
38	Crocker, s.....	Ariz.	10,000,000	100,000	100	105,000	Feb. 1888 .20
39	Crowell, G.....	N. C.	500,000	500,000	1	*	....
40	Dahlonega, G.....	Ga...	250,000	250,000	1	*	....
41	Dandy, s.....	Colo.	5,000,000	500,000	10	.....	....
42	Dardanelles, G.....	Cal..	1,000,000	100,000	10	.....	....
43	Decatur, s.....	Colo.	1,500,000	300,000	5	*	....
44	Denver City, s. L..	Colo.	5,000,000	500,000	10	*	....
45	Denver Gold, G.....	Colo.	300,000	60,000	5	*	....
46	Durango, G.....	Colo.	500,000	500,000	1	*	....
47	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	990,000	Mar. 1886 1.00
48	El Cristo, G. s.....	U.S.C	1,000,000	500,000	2	.....	....
49	El Dorado, G.....	Cal..	1,000,000	250,000	4	*	....
50	El Talento, G.....	U.S.C	1,000,000	520,000	2	.....	....
51	Empire, s.....	Utah	10,000,000	100,000	100	*	....
52	Eureka Tunnel, s. L.	Nev..	10,000,000	100,000	100	*	....
53	Exchequer..... ..	Nev.	10,000,000	100,000	100	790.000	Sept 1888 .20
54	Found Treasure, G. s.	Nev..	10,000,000	100,000	100	18,030	July 1888 .06
55	Gogebic I. Syn., I ..	Wis.	5,000,000	200,000	25	*	....
56	Gold Cup, s.....	Colo.	500,000	500,000	1	*	....
57	Golden Era, s.....	Mon.	2 000,000	200,000	10	*	....
58	Gold Placer, G.....	Colo.	5,000,000	200,000	25	229,314	Dec. 1885 .25
59	Gold Rock, G.....	Cal.	1,000,000	500,000	2	*	....
60	Goodshaw, G..... ...	Cal..	10,000,000	100,000	100	*	....
61	Grand Belt, G.....	Tex.	12,000,000	120,000	100	.....	....
62	Grand Duke.....	Colo.	800,000	80,000	10	*	....
63	Great Remance, G...	U.S.C	1,000,000	500,000	2	*	....
64	Gregory-Bobtail, G..	Colo.	550,000	550,000	1	*	....
65	Gregory Con., G....	Mon.	3,000,000	300,000	10	.....	....
66	Harlem M. & M. Co, G.	Cal..	1 000,000	200,000	5	.....	....
67	Head Cent. & Tr. s. G.	Ariz.	10,000,000	100,000	100	.....	....
68	Hector, G.....	Cal..	1,500,000	300,000	5	.....	....
69	Highland, G.....	Mich	500,000	25,000	25	.....	....
70	Hollywood.....	Cal..	200,000	100,000	2	.....	....
71	Hortense, s.....	Colo.	2,000,000	200,000	10	.....	....
72	Huron, C.....	Mich	1,000,000	40,000	25	280,000	May 1887 3.00
73	Iron Gold & Silver, s	N. M.	2,000,000	200,000	10	*	....
74	Ironton, I.....	Wis.	1,000,000	40,000	25	.....	....
75	Iroquois, C.....	Mich	1,250,000	50,000	25	.....	....
76	J. D. Baymett.....	Ariz.	10,000,000	100,000	100	*	....
77	Julia Cons., G. s....	Nev..	11,000,000	110,000	100	1,650,000	Apl. 1887 .10
78	Kearsarge, C.....	Mich	1 250,000	50,000	25	190,000	Oct. 1887 1.00
79	Lacrosse, G.....	Colo.	1 000,000	100,000	10	*	....
80	Lee Basin, s. L.....	Colo.	5,000,000	500,000	10	*	....
81	Lucerne, s.....	Colo.	5,000,000	500,000	10	*	....
82	Mammoth Bar., G.	Cal..	10,000,000	100,000	100	50,000	Dec. 1881 .....
83	May Belle, G.....	Cal..	10,000,000	100,000	100	84,000	Mar. 1884 .15
84	Mayflower Gravel..	Cal..	1,000,000	100,000	10	375,000	July 1888 .50
85	Medora, G.....	Dak.	250,000	250,000	1	.....	....
86	Mexican, s. s	Nev..	10,000,000	100,000	100	2,725,760	Aug. 1888 .25
87	Middle Bar G.....	Cal..	400,000	200,000	2	*	....
88	Mike & Starr, s. L...	Colo.	1,000,000	200,000	5	*	....
89	Montana, G.....	Colo.	100,000	100,000	1	*	....
90	Moose Silver, s.....	Colo.	3,000,000	300,000	10	.....	....
91	Native, C.....	Mich	1,000,000	40,000	25	.....	.....

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

Name and Location of Company.	Oct. 6. H.	Oct. 6. L.	Oct. 8. H.	Oct. 8. L.	Oct. 9. H.	Oct. 9. L.	Oct. 10. H.	Oct. 10. L.	Oct. 11. H.	Oct. 11. L.	Oct. 12 H.	Oct. 12 L.	Sales.
Adams, Colo.	....	.....	.....	.....	1 80	1.70	1 50	.....	.....	.....	.....	.....	1,100
Alice, Mont.	.....	.....	.85	.75	.85	....	.90	....	1.10	.90	1.27	1.10	5,700
Argenta, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bassick, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belcher, Nev	.....	.....	.....	.....	5.13	....	.....	.....	.....	.....	.....	.....	100
Belle Isle, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bodie Cons., Cal.	.....	.....	.....	.....	1 25	....	1.25	1.20	1.45	....	.....	.....	1,300
Breece, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bulwer, Cal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Caledonia, Dak	.....	.....	.....	.....	.....	3.00	.....	3.00	.....	.....	.....	.....	300
Calumet & Hecla	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chollar, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chrysolite, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Colorado Cent'l, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	2.25	.....	.....	.....	2,000
Cons. Cal. & Va., Nev.	.....	.....	9.95	.....	9 95	9.63	10.00	.....	9.25	.....	.....	.....	700
Crown Point, Nev	.....	.....	.....	.....	5.00	.....	.....	.....	.....	.....	.....	.....	100
Deadwood, Dak.	.....	.....	.....	.....	.....	.....	.....	.....	1.75	.....	.....	.....	100
Dunkin, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eureka Cons., Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Father de Smet, Dak	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Freeland, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gould & Curry, Nev.	.....	.....	2 55	.....	3 10	.....	.....	.....	.....	.....	.....	.....	225
Grand Prize, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hale & Norcross, Nev	.....	.....	4.75	.....	.....	.....	.....	.....	5.00	.....	.....	.....	500
Holyoke, Idaho	.....	.....	.05	.....	.....	.....	.....	.....	.....	.....	.08	.....	700
Homestake, Dak.	.....	.....	11.50	10 50	.....	.....	11.0	.....	.....	.....	.....	.....	125
Horn-Silver, Ut.	1.10	.....	1 20	.....	1.05	.....	1.05	.....	.....	.....	.....	.....	1,132
Iron Hill, Dak.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iron Silver, Colo.	3.40	.....	3.40	.....	3.40	.....	.....	.....	.....	.....	.....	.....	3,400
Leadville C., Colo.	.12	.....	.12	.....	.....	.....	.....	.....	.....	.....	.12	.....	900
Little Chief, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Pittsburg, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Martin White, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mono, Cal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mount Diablo, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	2.75	.....	.....	.....	100
Navajo, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Belle Isle, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.55	.....	100
North Star, Cal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ontario, Ut.	.....	.....	.....	.....	.....	.....	.....	.....	33 25	.....	.....	.....	25
Ophir, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	7.13	.....	.....	.....	100
Plutus, Colo.	1.00	.....	1.05	.....	1.10	.....	1.20	1.05	1.05	.95	.....	.....	2,700
Plymouth, Cal.	.....	.....	8 00	7.88	8.13	7 50	8.00	7.25	7.13	7.00	7.50	7.00	3,520
Quicksilver Pref., Cal	39.00	.....	.....	.....	38.00	.....	38 50	38.25	38 50	.....	.....	.....	1,400
" Com., Cal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Robinson Cons. Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.90	.85	1,000
Savage, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	3.05	.....	.....	.....	250
Sierra Nevada, Nev.	.....	.....	.....	.....	3.60	.....	3.75	.....	3.90	.....	.....	.....	1,000
Silver King, Ariz.	2.00	1 90	2.25	1.60	.....	.....	2.15	2.10	2.00	.....	2.10	.....	1,975
Silver Mg. of L. V.	.25	.....	.....	.....	.....	.....	.25	.....	.25	.24	.....	.....	1,500
Small Hopes, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Standard, Cal.	1.25	.....	1.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	400
Stormont, Utah.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yellow Jacket	.....	.....	.....	.....	4.85	.....	.....	.....	.....	.....	.....	.....	250

NON-DIVIDEND-PAYING MINES.

Name and Location of Company.	Oct. 6. H.	Oct. 6. L.	Oct. 8 H.	Oct. 8 L.	Oct. 9. H.	Oct. 9. L.	Oct. 10. H.	Oct. 10. L.	Oct. 11. H.	Oct. 11. L.	Oct. 12. H.	Oct. 12. L.	Sales
Alta, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Amador, Cal.	2.25	....	2.25	2.15	2.25	....	2.25	...	2.25	....	2.25	....	2,100
Am'can Flag, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Astoria, Cal.	.23	....	.23	....	.23	....	.23	....	.23	....	.23	....	5,600
Barcelona, Nev.	.....	.....	.94	.....	.94	.....	.89	.....	.....	.....	.....	.....	900
Bechtel, Cal.	.....	.....	.....	.....	.....	.....	.....	.....	.10	.....	.....	.....	100
Best & Belcher, Nev.	.....	.....	.....	.....	4.70	.....	.....	.....	.....	.....	6 85	.....	320
Brunswick, Cal.	.....	.....	.15	.14	.15	.14	.14	.12	.....	.....	.12	.11	6,300
Buffalo Iron Min'g.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bullion, Nev.	1.95	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Cashier, Colo	.10	.....	.11	.10	.10	.09	.11	.10	.11	.10	.14	.11	29,100
Castle Creek, Id.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Central Aizona	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cleveland, Dak.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Colches, N. M.	2.25	2.20	2.25	..	2.30	2.25	2.25	2.10	2.15	....	2 10	..	1,700
Columbia & Beaver	.....	.....	.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,500
Con. Imperial, Nev	.....	.....	.....	.....	.....	.....	.70	.....	.80	.....	.....	.....	1,900
Con. Pacific	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Deer Creek, Idaho.	1.20	.....	.....	.....	1.20	.....	1.20	.....	.....	.....	1 20	.....	700
Eastern Oregon	.....	.....	.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,500
El Cristo, U. S. Col.	.....	.....	.58	.....	.....	.....	1.00	.71	.....	.....	.....	.....	1,400
Exchequer, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Found Treas'e, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hollywood, Cal.	.41	.40	.40	....	.40	....	.4	....	.80	.40	.40	....	4,800
Huron, Mich.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Julia, Nev.	.45	.....	.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	700
Kingst'n & Pemb'ke	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kossuth, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lacrosse, Colo	.10	.09	.10	.09	.10	.....	.10	.09	.10	.....	.12	.10	12,700
Lee Basin, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mexican, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Middle Bar, Cal.	.39	.....	.39	.....	.39	.....	.39	.....	.39	.....	.40	.....	4,100
Monitor, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N'th Standard, Cal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oriental & Miller	.....	.....	.07	.....	.07	.....	.....	.....	.....	.....	.....	.....	300
Phœnix Lead, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Phœnix of Ark.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.28	.....	500
Potosi, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Proustite, Idaho	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rappahann'k, Va.	.....	.....	.....	.....	.....	.....	.09	.....	.09	.....	.....	.....	1,500
San Sebastian, S'n S	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Santiago, U. S. Col.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
*Security, Colo.	.....	.....	.....	.....	.....	.....	.05	.....	.....	.....	.....	.....	200
Shoshone, Idaho.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver Cliff, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver Cord, Colo.	.65	.....	.....	.....	.....	.....	.....	.....	.....	.....	.65	..	68
Silver Queen, Ariz.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sutro Tunnel, Nev.	.11	.10	.11	.10	.13	.11	.15	.12	.14	.12	.13	.....	48,200
" Trust Cert.	63.00	60.00	66.00	63.00	67.00	64.00	68.00	67.00	68.00	....	70,00	67.00	11,000
Sutter Creek, Cal.	.....	.....	1.20	.....	1.20	.....	1.20	1.15	1.20	.....	.....	.....	1,200
Tornado, Nev.	.40	.....	.40	.....	.42	.35	.35	.....	.35	.....	.31	.....	3,600
Union Cons., Nev.	.....	.....	.....	.....	.....	.....	3 60	.....	.....	.....	4.00	.....	350
United Copper	1.25	1.10	1 25	..	1.25	....	1 25	1.10	1.10	....	1 15	1.10	1,700

*Ex. dividend. †Dealt in at the New York Stock Ex. Unlisted Securities. ‡Assessment unpaid. Dividend shares sold, 33,102. Non-dividend shares sold, 147,170. Total New York, 180,272.

BOSTON MINING STOCK QUOTATIONS.

Name of Company	Oct. 5.	Oct. 6.	Oct. 8.	Oct. 9.	Oct. 10.	Oct. 11.	Sales.
Atlantic, Mich.	19.00	.....	18.75 18.50	18.25	.....	.....	220
Bodie, Cal.	.....	.....	.....	.....	.....	.....	.....
Bonanza Developm't	.....	1.50	1.56 1.44	1.50	1.56 1.50	1.50	3,000
Bost. & Mont., Copper	52.25	51.50	52.50 52.00	52.88 52.25	54 63 52.50	55.00 54.25	57.00 55.50	3,077
Breece, Colo.	.....	.....	.....	.....	.....	.....	.....
Calumet & Hecla	298	296	....	299 298	....	299	....	127
Catalpa, Colo.	20	.....	.20	.20 .15	.15	.19	....	3,200
Central, Mich.	.....	.....	....	....	....	....	....	.....
Chrysolite, Colo	.....	.....	....	....	....	....	....	.....
Con. Cal. & Va., Nev.	.....	.....	....	....	....	....	....	.....
Dunkin, Colo.	.90	.....	....	....	.90	.92½ .90	.92½ .91	1,600
Enterprise	.....	.....	....	....	....	....	....	.....
Franklin, Mich.	18.25	17.50	18.25	18.50 18.00	18.13 18.00	18.00	18.50	1,730
Hale & Norcross, Nev.	.....	.....	....	....	....	....	....	.....
Honorine, Utah.	.....	.....	....	....	....	....	....	.....
Little Chief, Colo.	.....	.....	....	....	....	....	....	.....
Little Pittsburg, Colo.	.....	.....	....	....	....	....	....	.....
Martin White, Nev.	.....	.....	....	....	....	....	....	.....
Mono, Cal.	.....	.....	....	....	....	....	....	.....
Napa, Cal.	2.00	.....	....	2.00	....	....	....	200
Ontario.	.....	.....	....	....	....	....	....	.....
Osceola, Mich.	20.00	19.50	20 00	20.00	20.00 19.00	19.75 19.13	20.00 19.75	1,820
Pewabic, Mich.	4.50	4.31	4 25 4.00	4 25 4.00	....	4.13	4.25 4.00	1,400
Quincy, Mich.	84.00	83.00	84 00 83.50	84.00	....	....	....	155
Ridge, Mich.	2.25	2.00	2.13	2.13	2.13	2.00	2.00	2,300
Sierra Nev., Nev.	.....	.....	....	....	....	....	....	.....
Silver King, Ariz.	2.13	.....	....	....	2.25	....	2.06	115
Standard, Cal.	.....	.....	....	....	....	....	....	.....
Tamarack, Mich.	177½	.....	176	175	176 175	176	....	206

Name of Company.	Oct. 5.	Oct. 6.	Oct. 8.	Oct. 9.	Oct. 10.	Oct. 11.	Sales.
Allouez, Mich.	3.88 3.63	3.75	4.00 3.75	5 00 4.00	5.13 4.75	5.63 5.00	12,865
Arnold, Mich.	.37½ .30	.35	.30	.37½	.35	.35	2,000
Aztec, Mich.	....	.15	.12½	.14	....	.12	1,700
Brunswick, Cal.	....	....	....	....	....	....	.....
Canada	....	....	....	....	....	....	.....
Contentment.	....	....	....	....	....	....	.....
Crescent, Colo.	....	....	....	....	.08	.09	1,000
Cusi, N. Mex.	.07	....	....	....	....	....	100
Everett.	....	.60	....	.52½ .50	....	.55 .50	1,400
Hanover, Mich.	....	....	....	....	....	....	.....
Humboldt, Mich.	....	....	.15	.15	.15	....	400
Hungarian	.25	....	....	....	....	....	200
Huron, Mich.	....	..... b 50	....	5.50 5 25	....	....	3 0
Kearsarge, Mich.	12.25 11.88	12.38 12.13	14.38 13.25	16.50 14.75	16 00 15.00	15.50 15.00	11,218
Mesnard, Mich.	.56 .50	....	....	.50	....	.50	1,750
National, Mich.	5.25 5.13	5.25	5.25	5 50 5.25	5.25	5 50 5.25	2,625
Native, Mich.	....	....	....	....	....	....	.....
Oriental & M., Nev.	....	....	....	....	....	....	.....
Pontiac.	.40 .30	....	....	....	.45	.45	1,140
Rappahannock, Va.	.09	....	....	....	....	....	500
Security, Colo.	....	....	....	....	....	....	.....
Shoshone, Idaho.	....	10	....	.11	....	12	900
South Side, Mich.	.25	.25 .22½	.25	....	....	....	2,180
St. Mary's.	.30	....	....	....	....	....	100
Sullivan.	....	....	....	....	....	....	.....
Sutro Tunnel, Nev.	.11	....	....	....	....	....	300
Taylor Plumas, Cal	....	....	....	....	....	....	.....
Washington	....	.30	....	....	.35	.37½	700
Winthrop, Mich.	....	....	....	....	....	....	.....

Boston: Dividend shares sold, 19,160. Non-dividend shares sold, 41,378. Total Boston, 60,538.

COAL STOCKS.

Name of Company.	Par val. of sh'rs.	Oct. 6. H.	Oct. 6. L.	Oct. 8. H.	Oct. 8. L.	Oct. 9. H.	Oct. 9. L.	Oct. 10. H.	Oct. 10. L.	Oct. 11. H.	Oct. 11. L.	Oct. 12. H.	Oct. 12. L.	Sales.
American Coal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Barclay Coal.	.....	†16	.....	†16	.....	†16	.....	†16	.....	†16	.....	.....	.....	.....
Ches. & O. RR.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chic. & Ind. Coal RR.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do. pref.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Col. & Hocking Coal.	100	24	.....	22¾	.....	23¾	.....	23	.....	23¼	.....	.....	.....	600
Col., C. & I.	100	35¼	.. ..	36	35¾	35	.....	34¾	34	35⅝	34⅝	35½	35⅝	3,400
Connellsville Gas Coal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Consol. Coal.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Del. & H. C.	100	118⅜	117¾	119	118¼	118¼	117⅞	118	117⅞	118⅝	118¼	118⅜	118⅝	3,050
D., L. & W. RR.	50	142½	141⅝	142¾	141⅞	142½	141¼	142½	141½	142¾	141	142½	142	34,500
Hocking Valley.	100	28½	28	29⅛	28½	28¾	28½	29¼	28⅝	29¼	28½	29¼	29	7,440
Hunt. & Broad Top.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do. pref.	.....	46½	.....	46	45⅞	45¾	.....	46	.....	.....	.....	.....	.....	357
Lehigh C. & N.	50	.....	.....	51¾	.....	.....	.....	51¼	.....	.....	.....	.....	.....	88
Lehigh & W. B. Coal.	.....	.....	.....	.....	.....	30½	.....	.....	.....	.....	.....	32	31	1,400
Lehigh Valley RR.	50	55¼	.....	55¼	.....	55½	55⅝	55⅝	.....	55¼	54¼	...	.....	1,058
Mahoning Coal RR.	100	.. ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Marshall Con. Coal.	100	.....	.....	.....	.....	17	.....	.....	.....	.....	.....	18	17¾	300
Maryland Coal.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Montauk Coal.	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Morris & Essex.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	143¼	.....	40
New Central Coal.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. J. C. RR.	50	90½	90¼	91¼	90½	90⅞	89¾	90⅝	90¼	90⅝	90½	90¾	90⅝	6,845
N. Y. & S. Coal.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. Y., Susq. & Western	100	.....	.....	.....	.....	10¼	.....	10⅛	10⅜	10⅛	10⅜	10⅜	10	2,035
Do. pref.	100	.....	.....	.....	.....	36⅛	35½	35¾	.....	34¾	34¼	36¼	36	1,925
N. Y. & Perry C. & I.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Norfolk & Western R.R.	100	21	19¾	20¼	.....	.....	.....	20¼	19¾	.....	.....	20	.....	1,675
Do. pref.	50	55⅞	54⅝	55⅞	55¾	56⅛	55¼	55¾	55⅛	56	55⅝	56⅜	56	1,925
Penn. Coal.	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Penn. RR.	50	55¾	55¼	55¾	55½	55¾	55⅝	55¾	55⅝	55⅝	55¼	.....	.....	1,541
Ph. & R. RR.**	50	53⅜	52¾	54½	53⅜	53¾	52¼	54½	53⅛	53⅞	53¼	54½	53¾	183,914
Tennessee C. & I. Co.	100	31	.....	31½	31¼	31½	31¾	30½	.....	31⅛	31¼	31⅝	31¼	3,000
Westmoreland Coal.	100	* 65	.....	*65	.....	*65	.....	*65	.....	*65	.....	.....	.....	.....
Whitebreast Fuel Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wyoming Valley Coal	..	47	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10

*Bid. †Asked.
**Of the sales of this stock, 49,357 were in Philadelphia, and 134,557 in New York. Total sales, 255,698.

San Francisco Mining Stock Quotations.

Company.	Closing Quotations. Oct. 5.	Oct. 6.	Oct. 8.	Oct. 9.	Oct. 10.	Oct. 11.
Alpha	.....	.....	.....	.....	.....	.....
Alta.	1.45	1.50	1.55	1.55	1.65	2.70
Belcher.	.....	.....	.....	.....	.....	.....
Belle Isle.	.40	.35	.....	.40	.40	.40
Best & Bel.	3.60	3.90	4.45	4.65	4.55	4.62½
Bodie.	.....	1.20	1.20	1.25	1.30	1.40
Bulwer.	.....	.....	.....	.....	.....	.....
Chollar.	2.55	2.70	2.60	2.95	2.85	3.20
C'm'weal'h	4.25	4.25	4.15	4.15	4.25	4.25
Con. C. & V	10.25	10.00	9.62½	9.87½	9.37½	9.50
Con. Pac.	.....	.....	.....	.....	.....	.....
Crown Pt.	4.65	4.90	4.95	4.85	4.90	5.00
Eureka C.	.....	.....	3.50	3.50	3.50	.....
Gould & C.	2.60	2.75	2.90	3.10	2.95	3.45
Grd. Prize.	.....	.....	.....	.....	.....	.....
Hale & N.	4.70	4.95	4.95	5.12½	4.90	5.25
Mexican.	3.00	3.95	3.95	3.90	3.85	4.05
Mono.	.85	.....	.85	.80	.85	1.00
Mt. Diablo	.....	2.25	.....	2.50	2.50	.....
Navajo.	2.10	2.05	2.10	2.05	2.10	.....
Nev. Queen	4.00	.....	3.90	3.80	3.80	3.70
N. Belle I.	2.60	.....	2.70	2.75	.....	2.70
Ophir.	6.25	6.75	6.53	6.75	6 62½	7.00
Potosi.	2.25	2.40	2.30	2.70	2.60	2.95
Savage.	2.45	2 60	2.79	2.95	2.95	3.30
Scorpion.	.....	.....	.....	.....	.....	.....
Sierra Nev	3.35	3.55	3.55	3.50	3.60	3.90
Sutro Tun.	.....	.....	.....	.....	.....	.....
Tip Top.	.....	.....	.....	.....	.....	.....
Union Con.	3.30	3.45	3.45	3.50	3.60	3.80
Utah.	1.20	1.25	1.20	1.30	1

FINANCIAL.

NEW YORK, Friday Evening, Oct. 12.

The mining share market drags along in its usual dull and uninteresting way, and for the present there seems to be little prospect for a better change, although parties interested are strongly predicting greater activity in the near future.

Assessments are pouring in from many of the Comstock mining companies, and at present there seems to be no prospect for the "predicted" dividends. Consolidated California & Virginia continues to pay its monthly dividend regularly, and has just declared one for $108,000. The price fluctuates but little, and sales were made this week at from $9.25@$10. Yellow Jacket sold at $4.85. Sierra Nevada advanced from $3.60 to $3.90. Gould & Curry from $2.55 to $3.10, and Hale & Norcross from $4.75 to $5. Savage appeared at $3.05. Ophir at $7.13. Crown Point at $5. Belcher at $5.13. Union Consolidated at $3.60 to $4.00. Consolidated Imperial at 70@80c. Bullion at $1.95. Best & Belcher jumped from $4.70 to $6.88.

Tornado was quite active, but declined from 42@31c. North Belle Isle sold at $2.85.

A sale of Mount Deiblo, which is seldom dealt in in this city, was made at $2.75.

Sutro Tunnel shows a large business at from 10 to 15c., closing at 13c. There was quite a boom in the Trust Certificates, which advanced from 60 to 70c., selling to-day at from 67 to 70c.

Barcelona is quiet and declined from 94 to 89c.

United Copper, which was listed last week at $1, has sold this week as high as $1.25, selling to-day at from $1.10@$1.15.

A declining movement was shown in Plymouth Consolidated, which went from $8 to $7.

Brunswick was quiet, and declined from 15 to 11c.

Quicksilver Preferred was almost daily dealt in, and was steady at from $38 to $39.

Little is doing in the Bodie stocks. Bodie Consolidated shows a few sales, advancing from $1.20@$1.45. Standard Consolidated was firm at $1.25.

Daily transactions are recorded in the different Amador stocks. Middle Bar sold at from 39@40c.; Amador at from $2.15@$2.25; Hollywood at from 40@41c.; Sutter Creek at from $1.15@$1.20, and Astoria at 23c.

El Cristo was neglected; the price opened at 58, but on Wednesday advanced to $1. Only 1400 shares changed hands.

Homestake remains firm at from $10.50 to $11.50. Caledonia is quiet at $3, and Deadwood-Terra at $1.75.

Deer Creek, one of the latest "newcomers," held its own at $1.20. The promoters of this company, we believe, brought out Castle Creek and Holyoke some years ago, the prices of which now range at from 5 to 10c. It will be interesting to note the progress of Deer Creek. Will it follow the course of its neighbors?

Rappahannock shows a few sales at 9c.

Silver Mining of Lake Valley is selling at 24@25c.

Colchis, which advanced in the beginning of the week from $2.20@$2.30, declined in the latter part of the week to $2.10, at which price it sold to day.

Adams declined from $1.80 to $1.50. Robinson was only dealt in to-day, when it sold from 85c. to 90c. Platus advanced from $1 to $1.20, and later declined to 95c. Leadville sold at 12c. Iron Silver shows sales of 3900 shares at $3.40; Colorado Central one transaction at $2.25; Silver Cord a few at 63@65c.; Security at 5c. Lacrosse advanced from 9c. to 12c. Cashier was dealt in to the extent of 29,100 shares at prices varying from 9c. to 14c.

Considerable business was done in Alice, which advanced from 75c.@$1.27, at which price it sold to-day.

Phœnix, of Arkansas, came out to-day at 28c.

Full particulars of the election of directors of the Horn-Silver Mining Company at Frisco, Utah, on October 2d, are now at hand. The Washington-Whitlock party, thanks largely to the advice of the ENGINEERING AND MINING JOURNAL, held proxies for 171,101 shares, while Francklyn was supported by 157,823 shares, making a total of 328,924 votes cast. This indicates the interest that stockholders feel in the present struggle for the management of the company, as the entire capital stock is only 400,000 shares, which is distributed among 900 shareholders, who reside in nearly every part of the world. It is undeniable, therefore, that the showing of 328,924 shares represented is an excellent one. The directors elected by the Washington-Whitlock party are as follows: Allan C. Washington, Bache McE. Whitlock, Andrew R. Culver, and Benjamin F. Ham, of New York, and P. T. Farnsworth, Wm. J. Jennings and Jas. T. Little, of Utah. At a subsequent meeting of the directors, A. C. Washington was elected President; Bache McE. Whitlock, Vice-President; and James T. Little, Treasurer. A Secretary has yet to be chosen, and it is also rumored that some changes in the management of the mine have been comtemplated. Every effort will be made to reduce expenses, and we are informed that the offices of the company in this city (now located in the magnificent Mills Building, at a rental of $2,000 per year) will be removed to cheaper, if less pretentious, quarters, and a general reduction of salaries will be made. The yearly report will be issued as usual on the 1st of January, and thereafter reports will be made every three months.

Concerning the mine management, we quote from the Salt Lake *Tribune* as follows: "The Utah directors will within the next eight or ten days make a thorough examination of the mine with a view to further operations and developments. If, upon inspection, the mine should be found worthy of further money being expended upon it, work will again progress as it did prior to the cave-in four years ago. There is now in the treasury about $70,000, and the mine last year cleared about $1000 a month."

The stock, in consequence of the victory of the Washington-Whitlock party, advanced to $1.20, and later declined to $1.05. The price of Ontario is steadily advancing and this week reached $33.25.

The official statement of the Silver King Mining Company, of Arizona, gives surplus on hand October 1, as $92,000. It is stated that the policy of the company will be to keep a surplus of $100,000, and to declare dividends in excess. During the week sales of the stock were made at from $1.60 to $2.25, closing to-day at $2.10.

Auction Sale of Stocks.

The following securities were sold at auction in this city on the 10th inst.: 121 shares Colwell Lead Co., $101@$102 per share; $11,000 Central R. R. of New Jersey, 7 per cent. consolidated mortgage bonds, due February 1st, 1890, 105⅛; $1000 Central R. R. of New Jersey, 7 per cent. consolidated mortgage bond, due July 1st, 1899, 120; $10,000 Morris & Essex R. R. first mortgage 7 per cent. bonds, due May 1, 1914, 144¼; $1000 Morris & Essex R. R. second mortgage 7 per cent. convertible bond, due August 1st, 1891, 107⅞; 81 shares Pennsylvania Coal Co., 288; $100,000 New York, Lackawanna & Western Railway first mortgage 6 per cent. bonds, due 1921, $1000 each, 131¼; $50,000 Morris & Essex R. R. first consolidated mortgage 7 per cent. bonds, 141; $50,000 New York, Lake Erie & Western R. R. 5 per cent. funded coupon bonds, due 1969, 90; $35,000 Morris & Essex R. R. 7 per cent. (Jersey Shore Improvement) registered bond, due April 1st, 1889, 101¼; 733 shares Lehigh & Wilkes-Barre Coal Co., 31½; 150 shares Golden Nugget Mining Co. of California, full paid, unassessable, 25 cents per share; $6,000 St. Louis Ore and Steel Co. first mortgage 6 per cent. bonds due January 1st, 1917. Interest January and July, 46¼.

Electric Stocks.

Owing to the rapid development and increasing importance of electrical light and power companies, we shall hereafter publish weekly the quotations and prices of stocks of the principal companies, or those that are sold in this city. The following quotations are furnished by Messrs. Crossman & Quick, brokers of this city: Edison, $115@$125; Edison Illuminating, $85@$87; Edison European, $8; Consolidated, $55@$65; Westinghouse, $25@$24½; United States Illuminating, $50@$75; Daft, $60.

Pipe Line Certificates.

Messrs. Watson & Gibson, petroleum brokers, report as follows for the week:

It may be of interest at this time to give some figures in relation to petroleum. Four years ago the maximum net stock on top of ground was 39,000,000 barrels; October 1st this year the stock was 21,800,000 barrels. The present daily production is about 45,000 barrels, which, by increased drilling, may be increased to 53,000 by spring, and that since the daily shipments from October, 1887, to April 1st, 1888, were 79,000 barrels, it will be seen that the consumption is far ahead of production.

Of course, speculation in petroleum is stagnant, and the demand for refined for export is strangely apathetic, with ocean freight rates high, but we believe this will all change soon in favor of holders. We look for higher prices.

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

		Opening.	Highest.	Lowest.	Closing.	Sales.
Oct.	6	93¾c.	93¾c.	92c.	92¼c.	813,000
	8	92¼	94	92	92¾	1,760,000
	9	92⅝	93⅝	92⅛	92¾	683,000
	10	93⅛	93⅝	91⅞	92¼	1,587,000
	11	92⅞	93⅝	92⅞	93⅛	1,423,000
	12	93⅝	94⅝	93¼	94⅝	1,108,000
Total sales in barrels						7,374,000

NEW YORK STOCK EXCHANGE.

		Opening.	Highest.	Lowest.	Closing.	Sales.
Oct.	6	93¼c.	93⅝c.	91⅝c.	92¼c.	550,000
	8	9.¼	94	92	92¾	873.000
	9	92⅛	93⅞	92⅛	92¾	862,000
	10	93	93⅝	91⅞	92⅝	685,000
	11	92¾	93⅝	92¾	93⅛	435,000
	12	93½	94⅝	93⅛	94⅛	571,000
Total sales in barrels						3,976,000

Meetings.

Edison Electric Light Company, No. 16–18 Broad street, New York City, October 23d, at 12 o'clock, noon.

Guyabillas Mining Company, Room 220, No. 1 Broadway, New York City, November 1st, at 4 o'clock P. M.

Dividends.

The following dividends have been declared:

Colorado Oil Company, of Colorado, has declared a dividend of 5 per cent on the capital stock, payable October 15th at No. 155 Stewart Building.

Copper Queen Consolidated Mining Company, of Arizona, dividend No. 2, fifty cents per share, or $70,000, paid October 1st.

Boston & Montana Consolidated Copper and Silver Mining Company, of Montana, dividend No. 2, two dollars per share, or $200,000, payable November 2d.

Consolidated California & Virginia Mining Company, of Nevada, dividend No. 22, fifty cents per share, or $108,000, payable October 10th.

Granite Mountain Mining Company, of Montana, dividend No. 46, fifty cents per share, or $200,000, paid October 10th.

Montana Mining Company, Limited, of Montana, quarterly dividend No. 14, of 3d. per share, or $41,250, payable October 15th, in London.

New York & Honduras Rosario Mining Company, of Honduras, ten cents per share, payable October 29th.

United Gas Improvement Company, dividend of four per cent, payable October 15th at No. 333 Walnut street, Philadelphia, Pa.

Assessments.

Company.	No.	When levied.	D'l'nq't in office.	Day of sale.	Amn't per share.
Alta, Nev.	38	Sept. 28	Nov. 5	Nov. 26	.50
Amer. Eagle, Cal.	1	Sept. 20	Oct. 25	Nov. 15	.10
Anchor, Utah	8	Sept. 28	Nov. 3	Nov. 20	.10
Baltimore, Nev.	3	Sept. 22	Oct. 2[illegible]	Nov. 13	.25
Belcher, Nev	26	Sept. 18	Oct. 23	Nov. 12	.50
Bodie, Cal.	9	Sept. 24	Oct. 29	Nov. 30	.50
Cedar Rapids, Dak.	5	Aug. 25	Sept 30	Oct. 17	.05
Chollar, Nev	26	Oct. 9			.50
Crown Pt., Nev.	50	Oct. 2	Nov. 5	Nov. 26	.50
Desire, Dak.	3	Sept. 7	Oct. 9	Oct. 26	.002½
Dickert & Myers, Utah	1	Sept. 4	Oct. 9	Oct. 30	.50
Empire, Cal	1	Sept. 19	Oct. 22	Nov. 8	.25
Exchequer, Nev.	26	Sept. 6	Oct. 10	Oct. 31	.20
Gould & Curry, Nev.	60	Oct. 4	Nov. 9	Nov. 30	.30
Iron Hill, Dak.	14	Sept. 15	Oct. 17	Nov. 3	.03
Justice, Nev.	47	Sept. 25	Oct. 31	Nov. 19	.25
Lady Wash., Nev.	7	Aug. 21	Sept. 26	Oct. 16	.25
Locomotive, Nev.	3	Aug. 21	Sept. 26	Oct. 16	.25
Live Oak Drift.	10	Aug. 20	Sept. 27	Oct. 19	.05
Mekada, Dak.	1	Sept. 25	Oct. 27	Nov. 17	.002
Montreal, Utah	1	Aug. 17	Oct. 1	Oct. 20	.01
Montrose, Colo.	1	Oct. 3	Nov. 12	Dec. 15	.01½
Mono, Cal.	26	Sept. 20	Oct. 23	Nov. 28	.50
Ophir, Nev.	54	Sept. 1	Oct. 4	Oct. 24	.50
Potosi	31	Oct. 1	Nov. 6	Nov. 27	.50
Ross Hannibal, Dak.	3	Sept. 25	Oct. 27	Nov. 17	.002
Savage, Nev.	71	Oct. 4	Nov. 7	Nov. 27	.50
Spruce Gulch, Dak.	3	Sept. 19	Oct. 25	Nov. 10	.001
Virginia Creek, Cal.	6	Aug. 29	Oct. 9	Oct. 29	.06
Wall St., Dak.	1	Sept. 20	Oct. 22	Nov. 15	.001½
West Salem, Dak.	1	Sept. 5	Oct. 8	Oct. 26	.001½

At a meeting of the Board of Directors of the Keyes Silver Mining Company, held Saturday, September 15th, assessment No. 2, of fifty cents per share, levied July 19, 1888, was rescinded.

FINANCIAL STATEMENTS.

The following are the financial balances of the various mining companies on October 1st:

	CASH ON HAND.		
Alpha Con.	$5,694.89	Holmes.	$1,057.11
Alta.	10,271.14	Independence.	3 356.75
Andes.	2,500.84	Julia.	869.08
Belcher.	3,557.66	Lady Wash'g'n	22,979.79
Belle Isle	3,429.86	Mexican.	19,746.33
Best & Belcher.	3,496.76	Mono.	9,150.49
Bodie	17,284.04	†Occidental.	170.26
Bullion	48,700.64	Peerless	1,375.85
Bulwer	15,623.77	Poudere.	119.82
*Con. Cal. & Va.	96,025.76	Sierra Nevada.	9,800.18
Confidence	36,578.75	Silver Hill.	13,045.08
Crocker.	9,042.87	Standard.	22,571.50
Dana	5,465.85	Scorpion.	4,728.20
Dudley	409.16	Syndicate.	9,406.89
Exchequer.	2,534.85	Union Cons.	10,269.54
Gould & Curry.	31,293 09	Utah Cons.	2,684.99
Hale & Norcross	31,293.09	Weldon	3,356.75

* Cash in bank and unsold bullion on hand valued at $94,517.16, with further shipments to arrive before the close of the fiscal month.

† Unsold bullion on hand valued at $3,429.23.

	INDEBTEDNESS.		
Baltimore	$37,000.00	North Common-wealth.	$16,753.20
Challenge	2,443.67	North Belle Isle.	23,627.05
Chollar	34,608.56	†Nevada Queen.	39,084.96
Crown Pt.	18,746.13	Ophir.	6,869.31
Commonwealth	8,974.27	Peer.	3,889.56
Del Monte.	10,386.02	‡Potosi.	42,702.46
Grand Prize.	41,281.85	Savage.	72,694.97
Imperial.	608.04	Seg. Belcher.	16,624.98
*Locomotive	2,919,82		
Navajo.	14,350.72		

*With $1,971.21 cash on hand.

† With bullion valued at $25,000 in transit.

‡ With assessment pending, to be collected.

Boston Mining Stocks. Oct. 11.

[From our Special Correspondent.]

Copper stocks have been in high favor the past week, and while railroad and other stocks have ruled heavy, with a declining tendency, coppers have advanced, both on merit and speculation. The interest of the market centered in Kearsarge, Boston & Montana and Allouez, all of which show a handsome advance over last week's prices, and there is hardly a stock on the list that is not in better demand, and will doubtless sell much higher than at present. Calumet & Hecla touched $299 again, but very little stock comes out even at this price, and would-be buyers must pay more for it in order to get it.

Boston & Montana advanced from $51¼ to $55¼, with good buying. The stock is getting to be quite a favorite and will well repay purchasers at the present price.

Kearsarge continued its progress upward from last week and touched $16½, against closing of $11⅝ on Thursday last. At that price there was some desire to realize, and stock coming out freely caused a reaction to $15, with a recovery to $15½ to-day.

Allouez has been very active the past few days on reports that the company were about starting the mill, and the expectation that the mine will produce 3,000,000 pounds of copper the next 12 months at a cost of 10 cents per pound, which at the syndicate price of copper, will give a handsome profit to the stockholders. The stock sold early in the week at $3¾@$3⅞, but within the last few days there has been a very active demand for it, which has carried the price up to $5¼, and its friends are confident that it will sell much higher.

Franklin is looking better than last week and sold